Howard, Mike

From: Howard, Mike
Sent: Tuesday, April 17, 2007 1:18 PM
To: 'Chin, Ken (DEP)'; 'Szal, Gerald (DEP)'; 'DavidC.Noonan@State.MA.US'
Cc: 'Barry Fogel'
Subject: Tier II Data and Revised WQMP

Attachments: Draft WQMP FINAL 4-17-07.pdf; Weaver's Cove Chemical Tables.pdf

Ken, Dave and Gerry,

Here is the additional chemical data you requested as well as a copy of the revised water quality monitoring plan (WQMP) for dredging. The revised WQMP reflects our discussion last week and is consistent with the overview that Ted Barten provided to the group. We are also preparing a separate physical monitoring/plume verification plan that is responsive to your input and comments of last week. I will have that plan sent out to you as soon as it is ready.

I believe Barry is in the process of scheduling a follow up meeting with Rich et al to discuss these items. I am making arrangements to have my colleague, Maria Hartnett, join us for that meeting (Maria can speak to the chemistry data, etc).

Thanks.

Mike

Draft WQMP FINAL 4-17-07.pdf (...   Weaver's Cove Chemical Tables....

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Weaver's Cove Energy, LLC
Water Quality Monitoring Plan for Dredging Activities, April 17, 2007 Submittal

Background/Source Documents

Weaver's Cove Energy, LLC ("Weaver's Cove") application for Water Quality Certification for dredging activities, submitted on April 26, 2004 and updated on November 21, 2006.

Weaver's Cove response to written public comments on the Water Quality Certification dredging application, as submitted on March 2, 2007.

The underlying Massachusetts Environmental Policy Act ("MEPA") record, beginning with the Expanded ENF filed on June 30, 2003 through the SFEIR filed on June 15, 2006.

The Secretary's Certificate on the SFEIR (EOEA No. 13061), dated July 28, 2006.

Initial Verification of SSFATE Modeling Results

In the early stages of dredging (maintenance sediments), Weaver's Cove will undertake a field measurement program aimed at verifying the SSFATE modeling results presented during the NEPA and MEPA review processes. The methodology for this effort is described in a separate submittal.

Expected Dredge Sequencing and Schedule

As described in the MEPA record and the Water Quality Certification application, the proposed dredging program for the existing Fall River federal navigation channel and turning basin has an estimated planning volume of ~2,600,000 CY and is scheduled to be completed over three dredge seasons. With the exception of the sediments in the immediate vicinity of the existing wooden pier (i.e., TB-10)[1], the entire dredge volume has been found to be suitable for offshore disposal at the Rhode Island Sound Disposal Site ("RISD") and/or the Massachusetts Bay Disposal Site ("MBDS").

For planning and water quality monitoring purposes, the dredging program has been divided into 5 dredge elements. The five dredge elements are depicted on the attached Figure 1-1. So as to provide some context for the Water Quality Monitoring Program, a description of each of the five dredge elements, including the estimated planning volume, typical production rates, current dredging windows and schedule expectations, are provided below. This information is taken from the MEPA record and also appears in the dredging 401 WQC record. It should be recognized that the schedule expectations are outlined for the purpose of understanding the planned progress of the work. There may be instances where an additional dredge or an additional dredge season will be necessary to complete the required work for a given element within the approved dredge windows and the overall construction schedule.

[1] Tier III testing of the wooden pier sediments has been completed; a report is under review by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency.

- **Dredge Element 1 - Southern Reach or Lower Channel**: This dredge element is located south of the Braga Bridge in the open waters of Mount Hope Bay. The total planning volume in this reach is ~680,000 CY. Of this total, approximately 450,000 CY is in Massachusetts, the balance in Rhode Island. The material to be dredged is largely along the sides of the existing 400 ft wide channel. Typical production rate @ 2,000 CY/day. Work in Massachusetts waters below the Braga Bridge will occur ~ June 15 through January 15. Total Lower Channel work is expected to require 2 or 3 seasons, assuming one dredge.

- **Dredge Element 2 - S-Bend:** This area is located north of the Braga Bridge and south of the Brightman Street Bridge. Total planning volume is ~780,000 CY, thicker cuts. Typical production rate @ 3,000 to 6,000 CY/day. Dredging will be scheduled ~August 1 through January 15. The S-bend work is expected to require two seasons with one dredge.

- **Dredge Element 3 - Turning Basin Surface or Maintenance Sediments**: Planning volume is ~570,000 CY, thicker cuts along perimeter. Typical production rate @ 8,000 to 10,000 CY/day. Dredging will be scheduled ~ August 1 through January 15. WCE expects to complete this work during the first season using one large dredge.

- **Dredge Element 4 - Turning Basin Native Sediments:** Planning volume is ~550,000 CY. Typical production rate (open bucket) @ 3,000 to 5,000 cy/day. Dredging will be scheduled for ~ August 1 through January 15. WCE expects to complete this bulk of this work during the second season using one large dredge.

- **Dredge Element 5 - Pipeline Crossing**: Planning volume is ~33,000 CY. Dredging scheduled for November 1 through January 15. The pipeline dredging is expected to be completed in year 2 of the program.

Objective of Water Quality Monitoring Plan

The objective of the Water Quality Monitoring Plan is to demonstrate that the Weaver's Cove dredging program is being conducted in accordance with Massachusetts Water Quality Standards, as specified in the Water Quality Certification for the Project. As has been the case for past dredging and dredge material disposal projects, the Water Quality Monitoring Plan includes provisions for appropriate mixing zones. This monitoring plan is designed to demonstrate that applicable water quality criteria are met at the edge of the applicable mixing zone for each dredging element.

Outline of Proposed Water Quality Monitoring Plan

I. Parameters

- Measure turbidity (NTUs), dissolved oxygen ("DO"), temperature and salinity at three levels: near bottom, mid-depth and near surface;

- Upstream reference stations (Taunton River, Mount Hope Bay) at distances outside the influence of dredge activities;

- Measurements at two times: (1) around the dredging operation during slack tide; and (2) either down-current from the dredge at approximate mid-flood tide or down-current from the dredge at approximate mid-ebb tide;

- 300 foot radius[2] mixing zone for Dredge Elements 1, 4 and 5;

- 400 foot radius mixing zone for Dredge Element 2;

- 500 foot radius mixing zone for Dredge Element 3;

- Water quality criteria at edge of mixing zone: 50 NTU above background for turbidity, 5 ppm DO (or 80% of ambient DO when background DO is less than 6.25 ppm).

II. Sampling Technique and Equipment

- Sampling boats to be equipped with appropriate locational equipment (GPS) and depth finder, calibrated probes, data logger, communications gear.

- For slack tide conditions, take measurements at 4 cardinal compass points on circumference of mixing zone.

- For mid ebb or mid flood conditions, take measurements at 3 points on the circumference of the mixing zone, down current, point 1 centered on direction of flow, points 2 and 3 each at 7 to 10 degrees offset from flow center line.

- For each sampling event (i.e., "slack tide Turning Basin," "mid ebb or mid flood Turning Basin," "slack tide S-bend," etc), the measurements for each of the three depths (near bottom, mid-depth, near surface) will be repeated three times, and the results averaged for each point/each depth. Alternatively, if the logistics of repositioning the boat preclude repeating the measurements three times at each point and depth within a reasonable time frame, the sampling technique would be to record data over a 5 minute averaging period at each point and depth.

- An exceedance at a given location/depth will be defined as either the average of the three repetitions or the result of the five minute averaging period.

III. Conditions

- Dredging in a given reach will be allowed to reach representative "steady state" conditions before monitoring is initiated in a given element.

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[2] Mixing zone radius will be measured from the point of dredging

IV. Initial Frequency within any Dredge Element

- Daily[3] at slack tide, and at either mid ebb or mid flood tide.

- Continue for two weeks

- If no exceedances, move to once per week at slack tide and at either mid ebb or mid flood tide.

V. Frequency in Second Year in any Dredge Element

- Daily at slack tide, and at either mid ebb or mid flood tide.

- Continue for one week.

- If no exceedances, move to once per week at slack tide and at either mid ebb or mid flood tide.

VI. Frequency if Equipment is Changed (Larger Bucket, Closed Bucket to Open Bucket)

- If significant equipment changes are made during the course of work in a given segment in a given dredge season (e.g., larger bucket, switch from closed bucket to open bucket), measurement frequency will revert to daily for two weeks, and follow sequence as set forth in Paragraph IV above.

VII. Reporting to DEP

- Routine reporting will be on a weekly basis. Reports for a given week will be submitted to DEP no later than the close of business on Friday of the following week. Reports will be transmitted electronically in a format to be mutually agreed upon by DEP and Weaver's Cove.

- Exceedances of limits at the edge of the mixing zone will be reported to DEP within 24 hours (via email to a designated DEP contact).

- A full summary report for each dredge season will be provided to DEP within 30 days of the close of each dredge season. The report will compile data from all measurements taken during the dredge season, will report any exceedances and remedial measures undertaken, and will include a section describing any proposed revisions/refinements for subsequent dredge season.

- Any dredging activity reports prepared by the FERC-mandated Environmental Inspectors will be made available to DEP.

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[3] Daily is understood to mean 6 of seven days in a given week, as one day per week is expected to allow for crew rest, equipment checks, boat maintenance and other similar activities.

VIII. Actions if Exceedances are Measured

- If an exceedance is measured at the edge of the mixing zone (Turbidity [NTU] or DO [mg/l] or both), Weaver's Cove will instruct the dredge operator to reduce the production rate, as soon as practicable but no later than 8 hours from the documented exceedance. Measurements will be made the next day to confirm that the production rate reduction was sufficient to bring levels at the edge of the mixing zone below the specified limits. Measurements will then continue on a daily basis for two weeks. If there are no further exceedances, measurement frequency will revert to weekly.

- If a further exceedance is measured after the first production rate reduction, Weaver's Cove will instruct the dredge operator to make a further rate reduction, and the measurement plan outlined above will be repeated.

- If a further exceedance is measured after the second rate reduction, dredge efforts in the affected section will be halted for two days, during which time Weaver's Cove representatives will discuss further steps with DEP.

- If measured background DO levels drop below 3 mg/l, dredging efforts will be halted until background DO levels return to a minimum of 3.75 mg/l.

- In instances where a reduced dredging rate results in clear compliance with limits, Weaver's Cove would have the ability to increase production rates after notice to DEP. In all cases, sampling will be conducted as described in Paragraph IV above following each production rate adjustment.

IX. Safety and weather contingencies

- The Water Quality Monitoring Plan will be conducted as outlined above, subject to the ability of Weaver's Cove to limit or suspend monitoring efforts when such efforts cannot be conducted safely. Recognizing that the Water Quality Monitoring Plan will be conducted using seaworthy but small boats, there may be times when winds, wave height, extreme cold, river ice or other adverse conditions limit the extent of work which can be safely conducted.

- Based on experience to date, such adverse conditions are more likely to be experienced in the open waters below the Braga Bridge. Accordingly, there may be days when monitoring could be done in some elements, e.g., Turning Basin and S-Bend, but not on the same day in another element, e.g., the lower channel.

- It is anticipated that there will be instances when specific Water Quality Monitoring Plan sampling events will need to be cancelled so as to allow for the safe passage of large vessels or the repositioning of dredge equipment.

- Decisions as to cancellation of sampling activities due to safety concerns or other conditions will be the direct responsibility of the Water Quality Monitoring Plan crew leader.

- On-river monitoring will be conducted in daylight hours only.

X. Responsibility for Water Quality Monitoring Plan

- As an important element of the dredging program, implementation of the Water Quality Monitoring Plan will be the responsibility of Weaver's Cove. Weaver's Cove will likely employ an experienced environmental monitoring consultant for this activity. Alternatively, Weaver's Cove may use qualified and properly trained in-house staff for this effort. In either case, Weaver's Cove may provide the necessary boat(s), locational equipment, monitoring probes, data logging equipment, communications gear and safety gear. Weaver's Cove will also provide docking space, onshore office and equipment storage/maintenance areas for use by the team conducting the Water Quality Monitoring Plan.

- The monitoring crew will have access to the Weavers Cove marine science, modeling and permitting consulting team (i.e., ASA, Epsilon, Concept2Delivery, etc), as appropriate, during the Water Quality Monitoring Plan effort.

XI. Observation/Audit by DEP

- DEP personnel may observe the Water Quality Monitoring sampling activities at any time, subject to space availability in the boat(s) and reasonable coordination with the crew.

- Prior to the start of the program, Weaver's Cove will request that DEP provide proof of proper insurance coverage and will also ask DEP to sign an appropriate indemnification document in connection with on-water observation activities.

- In cold weather months, DEP personnel will be responsible for providing their own safety gear. The crew leader will have the right to refuse to take anyone on board who, in his or her judgment, does not have proper safety gear for the expected conditions.

- Weaver's Cove will provide contact information for the Water Quality Monitoring Plan crew leader and arrangements for field observation will be made through the crew leader.

- These provisions apply to DEP personnel only. While representatives of other agencies (i.e., Army Corps, USEPA) will be welcome to observe the Water Quality Monitoring Plan, specific arrangements will be made with other agencies.

Statistical Summary

Weaver's Cove Energy, LLC — Revised October 2, 2003

Undetects are halved*

	Parameter	Analytical Method	Detection Limit	Fines & Coarse: Turning Basin + Channel Samples Comp Avg	Max	95 ucl	Det. Freq	# Detects/# Samples	Fines: Turning Basin + Channel Samples Comp Avg	Max	95 ucl	Det. Freq	# Detects/# Samples
	USACE PARAMETERS												
1	**PAHs**	GC/MS-SIM	ppb										
2	Naphthalene	PAH SIM	20	224	5700	424	70.91%	39/55	278	5700	530.5	83.72%	36/43
3	Acenaphthylene	PAH SIM	20	106	690	136	67.27%	37/55	128	690	163.2	79.07%	34/43
4	Acenaphthene	PAH SIM	20	34	380	49	41.82%	23/55	41	380	59.1	51.16%	22/43
5	Fluorene	PAH SIM	20	53	410	70	58.18%	32/55	62	410	84.3	67.44%	29/43
6	Phenanthrene	PAH SIM	20	271	1300	344	76.36%	42/55	330	1300	414.1	88.37%	38/43
7	Anthracene	PAH SIM	20	165	720	211	69.09%	38/55	200	720	253.5	81.40%	35/43
8	Fluoranthene	PAH SIM	20	483	1800	612	78.18%	43/55	592	1800	738.5	90.70%	39/43
9	Pyrene	PAH SIM	20	772	4800	1004	80.00%	44/55	940	4800	1211.9	90.70%	39/43
10	Benzo[a]anthracene	PAH SIM	20	334	1500	427	74.55%	41/55	405	1500	513.5	86.05%	37/43
11	Chrysene	PAH SIM	20	367	1600	469	76.36%	42/55	448	1600	565.2	88.37%	38/43
12	Benzo[b]fluoranthene	PAH SIM	20	355	1300	446	76.36%	42/55	431	1300	535.1	88.37%	38/43
13	Benzo[k]fluoranthene	PAH SIM	20	357	1700	452	72.73%	40/55	437	1700	546.2	86.05%	37/43
14	Benzo[a]pyrene	PAH SIM	20	409	1800	516	78.18%	43/55	495	1800	616.4	88.37%	38/43
15	Indeno[1,2,3-cd]pyrene	PAH SIM	20	143	510	178	70.91%	39/55	169	510	208.9	83.72%	36/43
16	Dibenz[a,h]anthracene	PAH SIM	20	50	190	62	65.45%	36/55	59	190	72.1	76.74%	33/43
17	Benzo[g,h,i]perylene	PAH SIM	20	136	470	170	70.91%	39/55	161	470	199.2	83.72%	36/43
18	**PCB Congeners**	GC/ECD	ppb										
19	Total PCB (Sum of Specified Congeners x 2)			50	274	66	8.0%^	19/55**	58.6	274.4	77.7	8.99%^	18/43**
20	**Pesticides**	GC/ECD	ppb										
21	4,4'-DDD	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
22	4,4'-DDE	8081A	20	10.7	25.0	11.5	5.45%	3/55	10.9	25.0	12.0	6.98%	3/43
23	4,4'-DDT	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
24	Aldrin	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
25	alpha-Chlordane	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
26	cis-Nonachlor	8081A		0.7	1.0	0.7	0.00%	0/55	0.7	1.0	0.8	0.00%	0/43
27	Dieldrin	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
28	Endosulfan I	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
29	Endosulfan II	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
30	Endosulfan sulfate	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
31	Endrin	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
32	gamma-BHC	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
33	gamma-Chlordane	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
34	Heptachlor	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
35	Heptachlor epoxide (B)	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
36	Hexachlorobenzene	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
37	Methoxychlor	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
38	Oxychlordane	8081A		0.7	1.0	0.7	0.00%	0/55	0.7	1.0	0.8	0.00%	0/43
39	Technical Chlordane	8081A		66.6	95.0	72.2	0.00%	0/55	73.4	95.0	79.0	0.00%	0/43
40	trans-Nonachlor	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
41	Toxaphene	8081A	20	66.6	95.0	72.2	0.00%	0/55	73.4	95.0	79.0	0.00%	0/43
42	**Metals**		ppm										
43	Arsenic	6020A	0.5	12.2	28.0	13.6	100.00%	55/55	14.3	28.0	15.5	100.00%	43/43
44	Cadmium	6020A	0.1	0.6	1.7	0.7	85.45%	47/55	0.7	1.7	0.9	95.35%	41/43
45	Chromium	6020A	1	125.3	420.0	155.2	100.00%	55/55	153.8	420.0	187.1	100.00%	43/43
46	Copper	6020A	1	65.1	180.0	78.9	100.00%	55/55	78.9	180.0	93.9	100.00%	43/43
47	Lead	6020A	1	80.1	360.0	98.8	100.00%	55/55	97.7	360.0	118.4	100.00%	43/43
48	Mercury	7471A	0.02	1.332	4.300	1.680	81.82%	45/55	1.640	4.300	2.034	93.02%	40/43
49	Nickel	6020A	1	21.2	36.0	23.3	100.00%	55/55	24.4	36.0	26.1	100.00%	43/43
50	Zinc	6020A	1	159.9	330.0	186.1	100.00%	55/55	190.5	330.0	216.5	100.00%	43/43

*Undetected samples are represented as one-half of the USACE Detection Limit.

**Represents the number of samples where at least one congener (out of 22) was detected.

^Detection frequency for Total PCBs was based on detection frequency of 22 individual congeners.

Chemical Results - USACE Parameters. *The data contained in this report shall not be reproduced or redistributed without the prior written consent of Weaver's Cove Energy, LLC.*

Weaver's Cove Energy, LLC — Revised October 2, 2003

DLs are Halved*

USACE Parameters	Analytical Method	Detection Limit	# Detects/# Samples	Average	Max	Min	TB-1 (0-9)	TB-2 (0-6)	TB-3 (0-6)	TB-3 (6-10)	TB-4 (0-6)	TB-4 (6-10)	TB 5 (0-4)	TB-6 (0-13)	TB-6 (13-15)	TB-7 (0-10)
PAHs	GC/MS-SIM	ppb		ppb	ppb	ppb	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Naphthalene	PAH SIM	20	39/55	224	5700	10	61	10 U	240	10 U	250	10 U	38	10 U	10 U	280
Acenaphthylene	PAH SIM	20	37/55	106	690	10	45	10 U	190	10 U	200	10 U	10 U	10 U	10 U	220
Acenaphthene	PAH SIM	20	23/55	34	380	10	10 U	10 U	55	10 U	49	10 U	10 U	10 U	10 U	56
Fluorene	PAH SIM	20	32/55	53	410	10	24	10 U	110	10 U	93	10 U	10 U	10 U	10 U	120
Phenanthrene	PAH SIM	20	42/55	271	1300	10	170	10 U	680	30	440	10 U	58	29	10 U	690
Anthracene	PAH SIM	20	38/55	165	720	10	90	10 U	360	10 U	320	10 U	38	10 U	10 U	410
Fluoranthene	PAH SIM	20	43/55	483	1800	10	230	10 U	1400	35	890	10 U	85	36	10 U	1100
Pyrene	PAH SIM	20	44/55	772	4800	10	490	43	2200	58	1400	10 U	210	45	10 U	1200
Benzo[a]anthracene	PAH SIM	20	41/55	334	1500	10	180	10 U	890	22	780	10 U	83	24	10 U	770
Chrysene	PAH SIM	20	42/55	367	1600	10	190	10 U	970	24	780	10 U	110	23	10 U	900
Benzo[b]fluoranthene	PAH SIM	20	42/55	355	1300	10	200	10 U	850	23	690	10 U	85	22	10 U	820
Benzo[k]fluoranthene	PAH SIM	20	40/55	357	1700	10	180	10 U	760	10 U	660	10 U	72	10 U	10 U	640
Benzo[a]pyrene	PAH SIM	20	43/55	409	1800	10	250	20	970	21	920	10 U	94	21	10 U	880
Indeno[1,2,3-cd]pyrene	PAH SIM	20	39/55	143	510	10	120	10 U	410	10 U	240	10 U	47	10 U	10 U	330
Dibenz[a,h]anthracene	PAH SIM	20	36/55	50	190	10	41	10 U	130	10 U	81	10 U	10 U	10 U	10 U	110
Benzo[g,h,i]perylene	PAH SIM	20	39/55	136	470	10	130	10 U	390	10 U	190	10 U	55	10 U	10 U	280
PCB Congeners	GC/ECD	ppb		ppb	ppb	ppb	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Total PCB (Sum of Congeners* x 2)			19/55	50	274	18	18.00 U	18.00 U	43.90	23.40 U	274.40	19.32 U	23.40 U	18.00 U	18.00 U	272.00
Pesticides	GC/ECD	ppb		ppb	ppb	ppb	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q
4,4'-DDD	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDE	8081A	20	3/55	10.73	25.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDT	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aldrin	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
alpha-Chlordane	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-Nonachlor	8081A		0/55	0.67	0.95	0.25	0 U	0 U	1 U	1 U	1 U	0 U	1 U	0 U	0 U	1 U
Dieldrin	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan I	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan II	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan sulfate	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endrin	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-BHC	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-Chlordane	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor epoxide (B)	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methoxychlor	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Oxychlordane	8081A		0/55	0.67	0.95	0.25	0 U	0 U	1 U	1 U	1 U	0 U	1 U	0 U	0 U	1 U
Technical Chlordane	8081A		0/55	66.60	95.00	24.50	44 U	44 U	95 U	65 U	80 U	42 U	65 U	43 U	42 U	90 U
trans-Nonachlor	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toxaphene	8081A	20	0/55	66.60	95.00	24.50	44 U	44 U	95 U	65 U	80 U	42 U	65 U	43 U	42 U	90 U
Metals		ppm		ppm	ppm	ppm	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q
Arsenic	6020A	0.5	55/55	12.19	28.00	0.78	5.50	2.20	18.00	14.00	14.00	2.30	12.00	7.00	2.70	19.00
Cadmium	6020A	0.1	47/55	0.608	1.700	0.050	0.210 E	0.140 E	0.750 E	0.150 E	1.000	0.05 U	0.260 E	0.05 U	0.120 E	0.970
Chromium	6020A	1	55/55	125.3	420.0	5.5	24.0	9.9 E	260.0 E	33.0 E	310.0	6.7	36.0 E	16.0	8.9	310.0
Copper	6020A	1	55/55	65.1	180.0	4.1	15.0	7.3 ¤	120.0 ¤	17.0 ¤	120.0	8.3	17.0 ¤	6.6	5.4	130.0
Lead	6020A	1	55/55	80.1	360.0	2.9	26.0	7.3 ¤	140.0 ¤	12.0 ¤	120.0 ¤N	6.6 ¤N	140.0 ¤	7.0	4.5	160.0 ¤N
Mercury	7471A	0.02	45/55	1.332	4.300	0.010	0.400	0.044 ¤E	2.400 ¤E	0.083 ¤E	3.900	0.010 U	0.220 ¤E	0.028	0.010 U	3.000
Nickel	6020A	1	55/55	21.2	36.0	5.6	8.5	7.7	28.0	19.0	24.0	8.4	16.0	10.0	7.8	29.0
Zinc	6020A	1	55/55	159.9	330	17	52	26	240	71	230	21	89	35	26	270

USACE Parameters	TB-7 (10-14)	TB-8 (0-8)	TB-8 (8-9)	TB-9 (0-4)	TB-10 (0-9)	TB-10 (9-22)	TB-11 (0-8)	TB-11 (8-17)	TB12 (0-3)	TB12 (3-12)
PAHs	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Naphthalene	10 U	170	10 U	35	560	5700	220	10 U	290	49
Acenaphthylene	10 U	100	10 U	28	240	270	190	10 U	230	42
Acenaphthene	10 U	30	10 U	10 U	170	380	50	10 U	110	10 U
Fluorene	10 U	59	10 U	10 U	250	410	92	10 U	180	20
Phenanthrene	10 U	380	10 U	68	1000	1300	480	10 U	700	100
Anthracene	10 U	200	10 U	37	720	700	310	10 U	520	82
Fluoranthene	10 U	840	10 U	99	1800	1600	860	10 U	1700	190
Pyrene	10 U	770	10 U	230	4800	2000	1300	10 U	2100	410
Benzo[a]anthracene	10 U	340	10 U	100	1500	1100	680	10 U	1100	260
Chrysene	10 U	340	10 U	100	1600	1100	660	10 U	1100	220
Benzo[b]fluoranthene	10 U	350	10 U	110	1300	950	660	10 U	980	150
Benzo[k]fluoranthene	10 U	330	10 U	89	1100	770	590	10 U	790	140
Benzo[a]pyrene	10 U	400	10 U	120	1400	1100	750	10 U	1200	230
Indeno[1,2,3-cd]pyrene	10 U	140	10 U	58	510	440	350	10 U	320	100
Dibenz[a,h]anthracene	10 U	49	10 U	10 U	190	160	110	10 U	110	33
Benzo[g,h,i]perylene	10 U	130	10 U	67	470	390	340	10 U	260	110
PCB Congeners	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Total PCB (Sum of Congeners* x 2)	26.00 U	29.20	18.00 U	25.20 U	69.50	28.80 U	23.40 U	18.00 U	168.40	28.00 U
Pesticides	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q
4,4'-DDD	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDT	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aldrin	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
alpha-Chlordane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-Nonachlor	1 U	0 U	0 U	1 U	1 U	1 U	1 U	0 U	1 U	1 U
Dieldrin	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan I	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan II	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan sulfate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endrin	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-BHC	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-Chlordane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor epoxide (B)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methoxychlor	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Oxychlordane	1 U	0 U	0 U	1 U	1 U	1 U	1 U	0 U	1 U	1 U
Technical Chlordane	65 U	48 U	25 U	70 U	85 U	80 U	65 U	38 U	95 U	70 U
trans-Nonachlor	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toxaphene	65 U	48 U	25 U	70 U	85 U	80 U	65 U	38 U	95 U	70 U
Metals	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q
Arsenic	17.00	17.00	5.30	13.00	19.00	28.00	14.00	0.78	19.00	13.00
Cadmium	0.05 U	1.100	0.05 U	0.230 E	1.300 E	1.400 E	0.800 E	0.05 U	1.400	0.410
Chromium	29.0	290.0	14.0	38.0 E	310.0 E	130.0 E	120.0	6.0	380.0	37.0
Copper	8.4	120.0	5.4	19.0 ¤	150.0 ¤	110.0 ¤	69.0	4.5	140.0	19.0
Lead	9.1 ¤N	150.0 NE	5.7 NE	27.0 ¤	160.0 ¤	360.0 ¤	87.0	2.9	210.0 ¤N	35.0 ¤N
Mercury	0.010 U	2.600	0.010 U	0.190 ¤E	3.900 ¤E	2.700 ¤E	1.600	0.010 U	4.200	0.360
Nickel	19.0	29.0	9.4	15.0	30.0	23.0	18.0	5.6	30.0	15.0
Zinc	68	260 N	33 N	81	330	290	180	17	300	100

Fine Material (>50% clay/silt)

Coarse Material (<50% clay/silt)

*Undetected samples are represented as one-half of the USACE Detection Limit

Chemical Results - USACE Parameters. *The data contained in this report shall not be reproduced or redistributed without the prior written consent of Weaver's Cove Energy, LLC.*

Weaver's Cove Energy, LLC — Revised October 2, 2003

DLs are Halved*

USACE Parameters	Analytical Method	Detection Limit	# Detects/# Samples	Average	Max	Min	TB-13 (0-2)	TB-13 (2-11)	TB-14 (0-12)	TB-15 (0-3)	TB-15 (5-11)	MA-19 (0-4)	MA-19 (4-13)
PAHs	GC/MS-SIM	ppb		ppb	ppb	ppb	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Naphthalene	PAH SIM	20	39/55	224	5700	10	130	10 U	250	10 U	10 U	10 U	10 U
Acenaphthylene	PAH SIM	20	37/55	106	690	10	140	10 U	170	10 U	10 U	10 U	10 U
Acenaphthene	PAH SIM	20	23/55	34	380	10	25	10 U	46	10 U	10 U	10 U	10 U
Fluorene	PAH SIM	20	32/55	53	410	10	59	10 U	97	10 U	10 U	10 U	10 U
Phenanthrene	PAH SIM	20	42/55	271	1300	10	270	10 U	490	10 U	10 U	10 U	10 U
Anthracene	PAH SIM	20	38/55	165	720	10	190	10 U	270	10 U	10 U	10 U	10 U
Fluoranthene	PAH SIM	20	43/55	483	1800	10	430	10 U	790	10 U	10 U	10 U	10 U
Pyrene	PAH SIM	20	44/55	772	4800	10	960	10 U	990	10 U	10 U	10 U	10 U
Benzo[a]anthracene	PAH SIM	20	41/55	334	1500	10	470	10 U	610	10 U	10 U	10 U	10 U
Chrysene	PAH SIM	20	42/55	367	1600	10	450	10 U	670	10 U	10 U	10 U	10 U
Benzo[b]fluoranthene	PAH SIM	20	42/55	355	1300	10	480	10 U	590	10 U	10 U	10 U	10 U
Benzo[k]fluoranthene	PAH SIM	20	40/55	357	1700	10	390	10 U	500	10 U	10 U	10 U	10 U
Benzo[a]pyrene	PAH SIM	20	43/55	409	1800	10	640	10 U	690	10 U	10 U	10 U	10 U
Indeno[1,2,3-cd]pyrene	PAH SIM	20	39/55	143	510	10	270	10 U	310	10 U	10 U	10 U	10 U
Dibenz[a,h]anthracene	PAH SIM	20	36/55	50	190	10	90	10 U	96	10 U	10 U	10 U	10 U
Benzo[g,h,i]perylene	PAH SIM	20	39/55	136	470	10	250	10 U	280	10 U	10 U	10 U	10 U
PCB Congeners	GC/ECD	ppb		ppb	ppb	ppb	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Total PCB (Sum of Congeners* x 2)			19/55	50	274	18	24.00 U	28.00 U	180.00	18.00 U	18.00 U	18.00 U	18.00 U
Pesticides	GC/ECD	ppb		ppb	ppb	ppb	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q
4,4'-DDD	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDE	8081A	20	3/55	10.73	25.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDT	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aldrin	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
alpha-Chlordane	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-Nonachlor	8081A		0/55	0.67	0.95	0.25	1 U	1 U	1 U	0 U	0 U	0 U	0 U
Dieldrin	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan I	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan II	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan sulfate	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endrin	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-BHC	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-Chlordane	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor epoxide (B)	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methoxychlor	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Oxychlordane	8081A		0/55	0.67	0.95	0.25	1 U	1 U	1 U	0 U	0 U	0 U	0 U
Technical Chlordane	8081A		0/55	66.60	95.00	24.50	60 U	70 U	80 U	48 U	43 U	44 U	47 U
trans-Nonachlor	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toxaphene	8081A	20	0/55	66.60	95.00	24.50	60 U	70 U	80 U	48 U	43 U	44 U	47 U
Metals		ppm		ppm	ppm	ppm	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q
Arsenic	6020A	0.5	55/55	12.19	28.00	0.78	11.00	12.00	22.00	8.90	1.10	6.80	1.40
Cadmium	6020A	0.1	47/55	0.608	1.700	0.050	0.650	0.110	0.890	0.05 U	0.05 U	0.05 U	0.110 E
Chromium	6020A	1	55/55	125.3	420.0	5.5	71.0	22.0	250.0	16.0	5.5	12.0	6.8
Copper	6020A	1	55/55	65.1	180.0	4.1	46.0	6.8	110.0	5.0 ¤	4.5 ¤	4.1	6.7
Lead	6020A	1	55/55	80.1	360.0	2.9	69.0 ¤N	7.8 ¤N	130.0 ¤N	5.6	3.1	4.7	3.3
Mercury	7471A	0.02	45/55	1.332	4.300	0.010	1.200	0.010 U	3.000	0.010 U	0.010 U	0.010 U	0.010 U
Nickel	6020A	1	55/55	21.2	36.0	5.6	11.0	14.0	29.0	10.0	6.5	8.5	7.0
Zinc	6020A	1	55/55	159.9	330	17	160	55	240	39	19	31	20

USACE Parameters	RI-1 (0-6)	RI-2 (0-4)	RI-3 (0-5)	RI-4 (0-5)	RI-5 (0-5)	RI-6 (0-6)	RI-7 (0-6)	RI-8 (0-6)
PAHs	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Naphthalene	10 U	10 U	90	51	10 U	56	100	76
Acenaphthylene	10 U	10 U	67	47	10 U	44	54	49
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	32	10 U	10 U	10 U	32	10 U
Phenanthrene	10 U	10 U	160	84	21	87	180	110
Anthracene	10 U	10 U	130	56	10 U	56	110	70
Fluoranthene	10 U	20	350	160	32	180	370	160
Pyrene	10 U	24	380	250	41	250	450	300
Benzo[a]anthracene	10 U	10 U	170	110	10 U	130	180	120
Chrysene	10 U	10 U	170	110	21	120	190	160
Benzo[b]fluoranthene	10 U	10 U	200	110	25	120	200	160
Benzo[k]fluoranthene	10 U	10 U	190	110	21	120	190	200
Benzo[a]pyrene	10 U	10 U	220	150	22	170	240	180
Indeno[1,2,3-cd]pyrene	10 U	10 U	90	69	10 U	79	83	71
Dibenz[a,h]anthracene	10 U	10 U	28	23	10 U	25	27	23
Benzo[g,h,i]perylene	10 U	10 U	83	68	10 U	80	78	63
PCB Congeners	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Total PCB (Sum of Congeners* x 2)	18.00 U	18.00 U	37.80	18.00 U	18.00 U	18.00 U	47.20	25.20 U
Pesticides	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q
4,4'-DDD	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDT	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aldrin	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
alpha-Chlordane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-Nonachlor	0 U	0 U	0 U	0 U	0 U	0 U	0 U	1 U
Dieldrin	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan I	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan II	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan sulfate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endrin	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-BHC	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-Chlordane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor epoxide (B)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methoxychlor	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Oxychlordane	0 U	0 U	0 U	0 U	0 U	0 U	0 U	1 U
Technical Chlordane	38 U	34 U	39 U	37 U	35 U	38 U	38 U	70 U
trans-Nonachlor	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toxaphene	38 U	34 U	39 U	37 U	35 U	38 U	38 U	70 U
Metals	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q
Arsenic	8.30	11.00	11.00	11.00	11.00	9.30	9.80	10.00
Cadmium	0.110	0.130	0.500	0.340	0.210	0.110	0.560	0.390
Chromium	34.0	36.0	93.0	61.0	41.0	34.0	97.0	65.0
Copper	11.0	14.0	68.0	38.0	16.0	13.0	70.0	45.0 E
Lead	11.0 NE	13.0 NE	68.0 NE	42.0 NE	17.0 NE	13.0 NE	68.0 NE	52.0 E
Mercury	0.024	0.110	0.520	0.490	0.120	0.083	1.000	0.420 N
Nickel	21.0	21.0	24.0	21.0	22.0	20.0	23.0	23.0 E
Zinc	69 N	74 N	170 N	120 N	83 N	70 N	160 NE	140

Fine Material (>50% clay/silt)
Coarse Material (<50% clay/silt)
*Undetected samples are represented as one-half of the USACE Detection Limit

Chemical Results - USACE Parameters. *The data contained in this report shall not be reproduced or redistributed without the prior written consent of Weaver's Cove Energy, LLC.*

Weaver's Cove Energy, LLC — Revised October 2, 2003

DLs are Halved* USACE Parameters	Analytical Method	Detection Limit	# Detects/# Samples	Average	Max	Min	MA-1 (0-8)	MA-2 (0-5)	MA-3 (0-6)	MA-3 (6-8)	MA-4 (0-8)	MA-5 (0-5)	MA-6 (0-3)	MA-7 (0-4)	MA-8 (0-5)	MA-9 (0-4)	MA-10 (0-3)	MA-11 (0-9)	MA-12 (0-9)	MA-13 (0-9)	MA-14 (0-8)	MA-15 (0-10)	MA-16 (0-9)	MA-17 (0-10)	MA-18 (0-13)	MA-20 (0-8)
PAHs	GC/MS-SIM	ppb		ppb	ppb	ppb	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Naphthalene	PAH SIM	20	39/55	224	5700	10	62	100	130	21	130	120	160	170	200	230	390	230	230	230	160	190	180	200	270	130
Acenaphthylene	PAH SIM	20	37/55	106	690	10	64	71	110	10 U	99	110	200	150	170	190	690	230	210	280	130	130	130	96	120	130
Acenaphthene	PAH SIM	20	23/55	34	380	10	10 U	11 U	11 U	10 U	10 U	11 U	24	30	31	47	82	66	44	47	33	43	48	49	54	10 U
Fluorene	PAH SIM	20	32/55	53	410	10	10 U	26	31	10 U	31	32	39	50	48	76	100	92	66	69	52	76	88	90	84	32
Phenanthrene	PAH SIM	20	42/55	271	1300	10	120	210	220	33	210	270	330	370	330	470	580	500	450	450	350	490	630	460	510	270
Anthracene	PAH SIM	20	38/55	165	720	10	68	100	140	10 U	120	120	160	230	200	260	560	270	230	250	210	290	340	250	290	160
Fluoranthene	PAH SIM	20	43/55	483	1800	10	180	310	400	45	370	420	580	630	610	770	1300	1000	820	920	740	920	1000	730	870	500
Pyrene	PAH SIM	20	44/55	772	4800	10	370	480	580	87	540	550	870	1200	850	1600	2900	1500	1400	1500	1100	1300	1400	1200	1200	820
Benzo[a]anthracene	PAH SIM	20	41/55	334	1500	10	200	200	240	35	230	240	390	400	360	500	1300	540	480	620	460	560	540	450	530	320
Chrysene	PAH SIM	20	42/55	367	1600	10	220	250	290	43	290	300	470	470	440	600	1500	670	590	760	490	600	610	480	630	370
Benzo[b]fluoranthene	PAH SIM	20	42/55	355	1300	10	250	260	350	36	320	350	470	560 J	470	740 J	1300	820	750 J	850	460	480	510	400	470	470
Benzo[k]fluoranthene	PAH SIM	20	40/55	357	1700	10	290	300	380	40	360	360	520	700 J	520	930 J	1700	930	910 J	1000	390	480	450	340	470	560
Benzo[a]pyrene	PAH SIM	20	43/55	409	1800	10	300	290	370	47	350	370	570	580 J	550	750 J	1800	730	700 J	860	560	650	640	500	610	470
Indeno[1,2,3-cd]pyrene	PAH SIM	20	39/55	143	510	10	95	130	100	25	100	110	170	130 J	150	170 J	320	170	180 J	200	300	310	330	240	300	120
Dibenz[a,h]anthracene	PAH SIM	20	36/55	50	190	10	29	38	37	10 U	34	38	56	49 J	49	61 J	120	63	63 J	70	99	100	120	83	100	41
Benzo[g,h,i]perylene	PAH SIM	20	39/55	136	470	10	81	120	95	29	90	100	160	120 J	140	150 J	290	150	180 J	180	320	340	360	270	340	100
PCB Congeners	GC/ECD	ppb		ppb	ppb	ppb	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)	ppb (Q)
Total PCB (Sum of Congeners* x 2)			19/55	50	274	18	25.20 U	30.60 U	41.00	23.40 U	28.80 U	32.40 U	30.60 U	67.60	28.80 U	27.00 U	60.00	53.30	51.70	32.40 U	69.20	107.70	85.00	69.20	210.40	28.80 U
Pesticides	GC/ECD	ppb		ppb	ppb	ppb	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q	ppb Q
4,4'-DDD	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDE	8081A	20	3/55	10.73	25.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	25 P	10 U	21 P	10 U	10 U	10 U	10 U	24 P	10 U	10 U	10 U	10 U	10 U	10 U
4,4'-DDT	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aldrin	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
alpha-Chlordane	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-Nonachlor	8081A		0/55	0.67	0.95	0.25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dieldrin	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan I	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan II	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan sulfate	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endrin	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-BHC	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
gamma-Chlordane	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor epoxide (B)	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methoxychlor	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Oxychlordane	8081A		0/55	0.67	0.95	0.25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Technical Chlordane	8081A		0/55	66.60	95.00	24.50	70 U	85 U	80 U	65 U	80 U	90 U	85 U	80 U	80 U	75 U	90 U	95 U	95 U	90 U	90 U	85 U	90 U	95 U	95 U	80 U
trans-Nonachlor	8081A	20	0/55	10.00	10.00	10.00	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toxaphene	8081A	20	0/55	66.60	95.00	24.50	70 U	85 U	80 U	65 U	80 U	90 U	85 U	80 U	80 U	75 U	90 U	95 U	95 U	90 U	90 U	85 U	90 U	95 U	95 U	80 U
Metals		ppm		ppm	ppm	ppm	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q	ppm Q
Arsenic	6020A	0.5	55/55	12.19	28.00	0.78	11.00	12.00	11.00	12.00	12.00	13.00	11.00	9.90	14.00	15.00	14.00	15.00	15.00	15.00	15.00	18.00	17.00	18.00	22.00	13.00
Cadmium	6020A	0.1	47/55	0.608	1.700	0.050	0.370	0.570	0.690	0.130	0.750	0.840	0.990	0.910	1.200	1.200	1.700	1.100	1.000	0.740	1.000	1.200	1.200	1.200	1.200	0.690
Chromium	6020A	1	55/55	125.3	420.0	5.5	64.0	110.0	120.0	35.0	130.0	160.0	120.0	120.0	200.0	210.0	180.0	230.0	220.0	130.0	210.0	290.0	290.0	320.0	420.0	120.0
Copper	6020A	1	55/55	65.1	180.0	4.1	40.0 E	79.0 E	83.0 E	13.0 E	88.0 E	100.0 E	77.0 E	81.0	120.0 E	110.0	110.0 E	120.0 E	120.0	82.0 E	110.0	150.0	140.0	150.0	180.0	75.0 E
Lead	6020A	1	55/55	80.1	360.0	2.9	45.0 E	77.0 E	90.0 E	14.0 E	93.0 E	99.0 E	95.0	92.0	130.0 E	130.0	150.0 E	150.0 E	140.0	93.0 E	130.0	150.0	150.0	150.0	170.0	82.0 E
Mercury	7471A	0.02	45/55	1.332	4.300	0.010	0.500 N	0.780 N	1.300 N	0.390 N	1.600 N	1.700 N	1.400 N	1.600	2.600 N	2.000	2.800 N	2.200 N	2.000	2.400 N	2.000	3.200	2.800	3.500	4.300	1.500 N
Nickel	6020A	1	55/55	21.2	36.0	5.6	23.0 E	27.0 E	26.0 E	19.0 E	28.0 E	30.0 E	23.0 E	21.0	28.0 E	27.0	25.0 E	30.0 E	28.0	28.0 E	30.0	33.0	31.0	33.0	36.0	25.0 E
Zinc	6020A	1	55/55	159.9	330	17	130	190	190	73	220	230	210	190	280	270	320	260	250	220	240	280	260	280	330	200

Fine Material (>50% clay/silt)

Coarse Material (<50% clay/silt)

*Undetected samples are represented as one-half of the USACE Detection Limit

Howard, Mike

From: Howard, Mike
Sent: Monday, April 23, 2007 3:01 PM
To: 'Chin, Ken (DEP)'
Subject: RE: Tier II Data and Revised WQMP

Ken,

One correction to below ... Maria double checked the so-called square symbol. Here is its meaning - (¤) = duplicate outside control limits.

Thanks, Mike

From: Howard, Mike
Sent: Monday, April 23, 2007 11:23 AM
To: 'Chin, Ken (DEP)'
Subject: RE: Tier II Data and Revised WQMP

Good morning Ken,

I spoke with Maria and here is the other information you were looking for:

E = Estimated Due to Interference
N = Spike Recovery Outside Control Limits
Square Symbol = nothing, artifact of cutting and pasting data - disregard.

Thanks,
Mike

From: Chin, Ken (DEP) [mailto:Ken.Chin@state.ma.us]
Sent: Friday, April 20, 2007 3:14 PM
To: Howard, Mike
Subject: RE: Tier II Data and Revised WQMP

Thanks Mike.

From: Howard, Mike [mailto:mhoward@Epsilonassociates.com]
Sent: Friday, April 20, 2007 3:11 PM
To: Chin, Ken (DEP)
Subject: RE: Tier II Data and Revised WQMP

Sorry for the delay Ken. I have been away from the shop. Here is the excel file and I left Maria a voice mail RE the qualifier symbols. She may not be around today.

Thanks, Mike

From: Chin, Ken (DEP) [mailto:Ken.Chin@state.ma.us]
Sent: Friday, April 20, 2007 2:31 PM
To: Howard, Mike
Subject: RE: Tier II Data and Revised WQMP

Mike,

I found the core depth in the spreadsheet, but I still need the Excel file. I want to compare the data set for each dredging element.

From: Howard, Mike [mailto:mhoward@Epsilonassociates.com]
Sent: Tuesday, April 17, 2007 1:18 PM
To: Chin, Ken (DEP); Szal, Gerald (DEP); DavidC.Noonan@State.MA.US
Cc: Barry Fogel
Subject: Tier II Data and Revised WQMP

Ken, Dave and Gerry,

Here is the additional chemical data you requested as well as a copy of the revised water quality monitoring plan (WQMP) for dredging. The revised WQMP reflects our discussion last week and is consistent with the overview that Ted Barten provided to the group. We are also preparing a separate physical monitoring/plume verification plan that is responsive to your input and comments of last week. I will have that plan sent out to you as soon as it is ready.

I believe Barry is in the process of scheduling a follow up meeting with Rich et al to discuss these items. I am making arrangements to have my colleague, Maria Hartnett, join us for that meeting (Maria can speak to the chemistry data, etc).

Thanks.

Mike

<<Draft WQMP FINAL 4-17-07.pdf>> <<Weaver's Cove Chemical Tables.pdf>>

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Statistical Summary

Weaver's Cove Energy, LLC — Revised October 2, 2003

Undetects are halved*

	Parameter	Analytical Method	Detection Limit	Fines & Coarse: Turning Basin + Channel Samples Comp Avg	Max	95 ucl	Det. Freq	# Detects/# Samples	Fines: Turning Basin + Channel Samples Comp Avg	Max	95 ucl	Det. Freq	# Detects/# Samples
	USACE PARAMETERS												
1	**PAHs**	GC/MS-SIM	ppb										
2	Naphthalene	PAH SIM	20	224	5700	424	70.91%	39/55	278	5700	530.5	83.72%	36/43
3	Acenaphthylene	PAH SIM	20	106	690	136	67.27%	37/55	128	690	163.2	79.07%	34/43
4	Acenaphthene	PAH SIM	20	34	380	49	41.82%	23/55	41	380	59.1	51.16%	22/43
5	Fluorene	PAH SIM	20	53	410	70	58.18%	32/55	62	410	84.3	67.44%	29/43
6	Phenanthrene	PAH SIM	20	271	1300	344	76.36%	42/55	330	1300	414.1	88.37%	38/43
7	Anthracene	PAH SIM	20	165	720	211	69.09%	38/55	200	720	253.5	81.40%	35/43
8	Fluoranthene	PAH SIM	20	483	1800	612	78.18%	43/55	592	1800	738.5	90.70%	39/43
9	Pyrene	PAH SIM	20	772	4800	1004	80.00%	44/55	940	4800	1211.9	90.70%	39/43
10	Benzo[a]anthracene	PAH SIM	20	334	1500	427	74.55%	41/55	405	1500	513.5	86.05%	37/43
11	Chrysene	PAH SIM	20	367	1600	469	76.36%	42/55	448	1600	565.2	88.37%	38/43
12	Benzo[b]fluoranthene	PAH SIM	20	355	1300	446	76.36%	42/55	431	1300	535.1	88.37%	38/43
13	Benzo[k]fluoranthene	PAH SIM	20	357	1700	452	72.73%	40/55	437	1700	546.2	86.05%	37/43
14	Benzo[a]pyrene	PAH SIM	20	409	1800	516	78.18%	43/55	495	1800	616.4	88.37%	38/43
15	Indeno[1,2,3-cd]pyrene	PAH SIM	20	143	510	178	70.91%	39/55	169	510	208.9	83.72%	36/43
16	Dibenz[a,h]anthracene	PAH SIM	20	50	190	62	65.45%	36/55	59	190	72.1	76.74%	33/43
17	Benzo[g,h,i]perylene	PAH SIM	20	136	470	170	70.91%	39/55	161	470	199.2	83.72%	36/43
18	**PCB Congeners**	GC/ECD	ppb										
19	Total PCB (Sum of Specified Congeners x 2)			50	274	66	8.0%^	19/55**	58.6	274.4	77.7	8.99%^	18/43**
20	**Pesticides**	GC/ECD	ppb										
21	4,4'-DDD	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
22	4,4'-DDE	8081A	20	10.7	25.0	11.5	5.45%	3/55	10.9	25.0	12.0	6.98%	3/43
23	4,4'-DDT	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
24	Aldrin	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
25	alpha-Chlordane	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
26	cis-Nonachlor	8081A		0.7	1.0	0.7	0.00%	0/55	0.7	1.0	0.8	0.00%	0/43
27	Dieldrin	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
28	Endosulfan I	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
29	Endosulfan II	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
30	Endosulfan sulfate	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
31	Endrin	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
32	gamma-BHC	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
33	gamma-Chlordane	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
34	Heptachlor	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
35	Heptachlor epoxide (B)	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
36	Hexachlorobenzene	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
37	Methoxychlor	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
38	Oxychlordane	8081A		0.7	1.0	0.7	0.00%	0/55	0.7	1.0	0.8	0.00%	0/43
39	Technical Chlordane	8081A		66.6	95.0	72.2	0.00%	0/55	73.4	95.0	79.0	0.00%	0/43
40	trans-Nonachlor	8081A	20	10.0	10.0	--	0.00%	0/55	10.0	10.0	--	0.00%	0/43
41	Toxaphene	8081A	20	66.6	95.0	72.2	0.00%	0/55	73.4	95.0	79.0	0.00%	0/43
42	**Metals**		ppm										
43	Arsenic	6020A	0.5	12.2	28.0	13.6	100.00%	55/55	14.3	28.0	15.5	100.00%	43/43
44	Cadmium	6020A	0.1	0.6	1.7	0.7	85.45%	47/55	0.7	1.7	0.9	95.35%	41/43
45	Chromium	6020A	1	125.3	420.0	155.2	100.00%	55/55	153.8	420.0	187.1	100.00%	43/43
46	Copper	6020A	1	65.1	180.0	78.9	100.00%	55/55	78.9	180.0	93.9	100.00%	43/43
47	Lead	6020A	1	80.1	360.0	98.8	100.00%	55/55	97.7	360.0	118.4	100.00%	43/43
48	Mercury	7471A	0.02	1.332	4.300	1.680	81.82%	45/55	1.640	4.300	2.034	93.02%	40/43
49	Nickel	6020A	1	21.2	36.0	23.3	100.00%	55/55	24.4	36.0	26.1	100.00%	43/43
50	Zinc	6020A	1	159.9	330.0	186.1	100.00%	55/55	190.5	330.0	216.5	100.00%	43/43

*Undetected samples are represented as one-half of the USACE Detection Limit.

**Represents the number of samples where at least one congener (out of 22) was detected.

^Detection frequency for Total PCBs was based on detection frequency of 22 individual congeners.

Howard, Mike

From: Howard, Mike
Sent: Wednesday, April 25, 2007 2:52 PM
To: Lehan, Richard (DEP); 'Chin, Ken (DEP)'; 'Szal, Gerald (DEP)'; 'Philip.Weinberg@State.MA.US'; 'DavidC.Noonan@State.MA.US'; Langley, Lealdon (DEP)
Cc: 'Barry Fogel'
Subject: Weaver's Cove - ASA Response to ACRE Memorandum

Attachments: Weaver's Cove-ASA 4-25-07 Response to ACRE Ltr .pdf

Folks,

As promised, here is Weaver's Cove/ASA response to the ACRE memorandum. We are working hard on the plume verification monitoring plan and we expect to have a draft of that plan emailed to you later today.

Please call me with any questions.

Thanks, Mike

Weaver's
/e-ASA 4-25-07 Res

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#79001/WeaversCove/SupplementalInfo/ACRE

April 25, 2007

Mr. Ken Chin
Massachusetts Department of Environmental Protection
Wetlands and Waterways Program
1 Winter Street
Boston, MA 02108

3 Clock Tower Place, Suite 250
Maynard, MA 01754
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Subject: **Weaver's Cove Energy - Water Quality Certification for Dredging Activities (BRP-WW-07 & BRP-WW-10), Transmittal #W05-0847; Response to February 12, 2007 Memo from Applied Coastal Research and Engineering, Inc. to Save The Bay; provided to DEP by Rhode Island Department of Attorney General.**

Dear Mr. Chin:

By letter dated March 19, 2007, the Rhode Island Department of Attorney General ("RIAG") submitted to you a copy of a two page memorandum dated February 12, 2007, addressed to John Torgan of Save the Bay from John Ramsey of Applied Coastal Research and Engineering, Inc. ("ACRE"). The ACRE memorandum was based on a review of the Weaver's Cove June 15, 2006 Supplemental Final Environmental Impact Report ("SFEIR").

The March 19, 2007 RIAG letter references the Water Quality Certification for Dredging Activities (BRP-WW-07 & BRP-WW-10), Transmittal #W05-0847) filed by Weaver's Cove Energy, LLC. In that the public comment period on that application closed on January 3, 2007, the letter from the RIAG and the accompanying ACRE memorandum were not filed as public comment on the Weaver's Cove application.

However, in order to provide you with accurate information regarding these issues, Weaver's Cove is providing the following responses to the points raised in the ACRE memorandum. In the format below, each original ACRE comment is repeated, along with the response from Weaver's Cove. A complete copy of the RIAG letter and the ACRE memorandum are also attached for ease of reference.

ACRE Comment No. 1

As requested, Applied Coastal Research and Engineering, Inc. (Applied Coastal) has reviewed the Weaver's Cove Energy LNG Project Supplemental Final Environmental Impact Report (SFEIR) dated June 15, 2006. In general, our review comments are limited to the modeling information presented within the SFEIR, as well as the proposed sediment/water quality monitoring. Much of the detailed modeling information is contained in previous versions of the environmental permitting documents or in reports/papers not related to the proposed LNG project.

As noted throughout the SFEIR, there have been significant hydrodynamic and water quality modeling efforts performed for a wide-range of projects within the Mount Hope Bay estuarine system. According to the SFEIR, the hydrodynamic model that simulates tidal circulation within the estuary has undergone extensive testing and has been calibrated and validated for this region. Based on the numerous publications regarding the baseline hydrodynamic model, it appears those circulation patterns associated with present conditions are accurately simulated by WQMAP. The refined modeling associated with this project consisted of increased grid resolution in the vicinity of the proposed dredging. This refined hydrodynamic model was calibrated with current measurements located at the proposed terminal site.

Weaver's Cove Response to Comment No. 1

According to this comment, ACRE concurs that the hydrodynamic modeling performed was appropriate and acceptable. However, to the extent that ACRE limited its review to information presented in the June 15, 2006 SFEIR and did not review the numerous studies, literature reviews, and independent assessments provided in prior parts of the permitting record, ACRE's other comments lack foundation.

ACRE Comment No. 2

Results from the hydrodynamic model (WQMAP) were used to drive a sediment transport model (SSFATE), jointly developed by Applied Science Associates and the U.S. Army Corps of Engineers. The SFEIR included a paper presented at the 36th TAMU Dredging Seminar in 2004, where the SSFATE model was applied to sites in the Chesapeake Bay and Florida (Swanson, et al., 2004). While this paper provides site-specific calibration information regarding the use of SSFATE at two sites, the calibration coefficients utilized in these examples cannot simply be *applied to other sites. Specifically, the sediment release rate of 0.5% may not be appropriate for sites with different bottom sediment release rates (0.22% to 1.32%) were incorporated into the model to simulate the extent of impacts associated with the proposed dredging. As a numerical exercise, this type of sensitivity analysis provides valuable information for assessing a range of possible impacts. However, it would be appropriate to include even larger values of sediment release rates that would be more consistent with empirically derived release rates of the proposed dredging technique. In this manner, the upper bound of model-predicted suspended sediment concentrations could be considered to be conservative.*

Weaver's Cove Response to Comment No.2

SSFATE calibration coefficients were not simply applied from Chesapeake Bay and Florida applications. The Applied Science Associates ("ASA") modeling work began with the high end of observations by Hayes and Wu (2001)[1] in Boston which ranged from 0.10% to 0.22% for closed buckets. The 0.22% release rate for closed buckets was then increased by a factor if six and applied for the maximum dredge rate in each modeled segment.

ASA agrees with ACRE's comment that the sensitivity analysis used is appropriate (and why it was originally used). ASA disagrees that the range of release rates was insufficient – as already noted, the value of 1.32% is six times the maximum value observed in Boston (0.22%).

ACRE Comment No. 3

The selection of model parameters in SSFATE relates directly to both the proposed mixing zones and the appropriate turbidity monitoring for the project. The Massachusetts DEP has indicated that the 1,000 foot mixing zone is excessively large. Therefore, it would be appropriate to limit the mixing zone to a smaller area (perhaps 100 meters) to ensure that water quality impacts associated with the dredging do not become excessive. According to the SSFATE model results described in Section 4 of the SFEIR, the model is typically conservative and tends to over-predict TSS concentrations and under-predict particle settling. If this is the

---

[1] Hayes, D. and P.-Y. Wu. 2001. Simple approach to TSS source strength estimates. Proceedings of the Western Dredging Association Twenty-first Technical Conference and Thirty-third Annual Texas A and M Dredging Seminar Special PIANC Session / Texas A and M University, Center for Dredging Studies, pg. 303, June, 2001.

case, the actual mixing zone during dredging should be significantly lower than the mixing zone predicted by the model. This smaller mixing zone should be utilized as the basis for Massachusetts DEP restrictions on turbidity relative to reference/background. Based on model predictions (Figure 4-1 of the SFEIR), TSS concentrations near the Turning Basin site are approximately 3-to-4 times higher for a 100 meter (330 feet) mixing zone than for the 1,000 foot mixing zone proposed.

Weaver's Cove Response to Comment No. 3

ACRE did not review the Draft Water Quality Monitoring Plan, included as Attachment K in the updated Water Quality Certification application, which proposed a 500-foot mixing zone for each of the five dredging elements. Other mixing zone dimensions proposed by Weaver's Cove are presently being discussed with DEP, along with a verification sampling plan for the SSFATE model.

ACRE Comment No. 4

In addition to suspended sediment concentration, the dissolved oxygen (DO) levels within the estuary are also a concern. During the summer months, system-wide hypoxia occurs within Mount Hope Bay. The limited proposed dredging along much of the navigation channel would have a negligible impact on DO levels within this region. However, the significant "bank-to-bank" deepening required for creation of the Turning Basin could exacerbate DO problems within the estuarine system. Since DO levels are related to water temperature, salinity, vertical mixing, and presence of organic matter, dredging of a relatively deep hole may cause further reductions in DO concentrations. Specifically, deepening of the channel and turning basin will directly influence salinity levels and possibly stratification characteristics of the estuarine system. From a long-term water quality perspective (related to both water column and benthic habitat), an analysis of dredging impacts on DO levels should be performed.

Weaver's Cove Response to Comment No. 4

ACRE agrees that Federal Channel dredging will have negligible impact on DO levels.

The dredging in the Turning Basin is not going to create a "relatively deep hole." In fact, the proposal is to dredge the Federal Channel to 37 feet and the Turning Basin to 41 feet, so the shallow difference in dimension will be 4 feet across a horizontal dimension of approximately 1,200 feet. Since this area is strongly tidally dominated, and because the depression is so shallow with such large plan dimensions (width and length), the tidal flow in the river will replace the water in the Turning Basin at each tide. The river presently flushes quickly in this area and an increase in cross sectional area will reduce the peak tidal current velocity only by 14%, from approximately 60 cm/s to 52 cm/s (118 feet per minute to 102 feet per minute). These velocities are consistent with other areas along the river where the river width and depth changes as one moves upstream and downstream.

To determine the potential for stratified conditions, ASA searched for historical data containing vertical profiles of salinity and dissolved oxygen in the lower Taunton River. One data set found was supplied by Gerry Szal of MADEP and was collected by Marine Research, Inc. as part of the monitoring for the Brayton Station in Somerset. The relevant data location was on the Borden Flats area just north of the Braga Bridge. The data were collected at surface, middle and bottom depths and in a water depth averaging of 18.2 feet. Data were collected each month from 1997 through 2003. The lower water column DO vertical gradient was calculated at -0.008 mg/L/ft. If this gradient can be assumed to extend to the channel bottom, the DO decrease, over a distance of 4 feet, is very small at 0.032 mg/L.

The second data set found was the so-called "Insomniacs" data (taken at night during the summers of 1999 through 2003 in Narragansett Bay and Mt. Hope Bay). This measurement program was designed to capture low DO levels typically found in pre-dawn hours during neap tides and low winds in the summer. A total of nine profiles were identified at a station described as "mid channel east of Green Can 15 off the USS Massachusetts just northeast of the Braga Bridge." Measurements were taken every 1 to 2 m in the vertical from near surface to near bottom (approximately 11.2 m). The average vertical salinity gradient found from the two adjacent near bottom measurements was 0.16 psu/m indicative of very small stratification. An increase of 4 ft in depth will increase the salinity by only 0.20 psu. The average vertical DO gradient was -0.05 mg/L/m, which is also very small. Using these data, an increase of 4 feet in depth would decrease DO by 0.07 mg/L. Thus, from actual data, there is little likelihood that the increased depth of the Turning Basin will cause increased stratification and lower DO. Thus, modeling the DO levels due to dredging impacts is not necessary.

Weaver's Cove addressed this issue in the March 2, 2007 submittal to MADEP responding to timely public comments (see response to TRWA.02).

ACRE Comment No. 5

As described above, the baseline hydrodynamic model can be expected to accurately simulate water circulation within the Mount Hope Bay/Taunton River estuarine system. However, secondary processes are more difficult to model accurately, since they often depend on multiple, often inter-related, variables. For the Mount Hope Bay/Taunton River system, suspension and transport of fine-grained materials is modeled by SSFATE. Although the model has been effectively calibrated for other regions (specifically, Chesapeake Bay and western Florida), a true calibration of the model for the Mount Hope Bay system would require a significant in situ data collection effort. Therefore, it may be most appropriate to utilize conservative assumptions for sediment release rates associated with the proposed dredging effort. Water column dissolved oxygen levels also may be a long-term concern as a result of the proposed deepening. Proposed alterations of the system bathymetry may allow higher salinity water to propagate further upstream, possibly enhancing stratification and exacerbating DO problems within the estuary. The existing three-dimensional hydrodynamic model should be utilized to assess long-term changes to circulation and stratification. Based on this modeling, the project proponent should indicate whether this alteration will have a long-term beneficial or adverse impact to water quality in the vicinity of the Turning Basin.

Weaver's Cove Response to Comment No. 5

Again, ACRE agrees that the hydrodynamic modeling approach used is accurate. In the Response to Comment No. 2 above, ASA explains why the loss rates are, in fact, conservative. ACRE suggests that true calibration requires in situ data collection. As noted above, Weaver's Cove is discussing with MADEP a field verification program to measure the actual extent of the suspended sediment plume in the water column.

Further, the overall area of the Turning Basin area is very small relative to the estuary and will have no effect on estuary-scale DO problems. The 14% reduction in current speed in the Turning Basin is well within normal variation based on spring-neap cycle. Based on an analysis of available data, there is no reason to expect near bottom stratification in the Turning Basin.

We hope you will find this response to be helpful.

Sincerely,
EPSILON ASSOCIATES, INC.

Michael D. Howard
Manager, Ecological Sciences

Theodore A. Barten, P.E.
Managing Principal

Encl.
CC: Phil Weinberg, DEP
Rich Lehan, Esq., DEP
Lealdon Langley, DEP
Ted Gehrig, Weaver's Cove Energy, LLC
Barry Fogel, Esq., Keegan Werlin LLP
Craig Swanson, PhD, Applied Science Associates

Attachment A – Memorandum from Applied Coastal Research and Engineering

Applied Coastal Research and Engineering, Inc.
766 Falmouth Road
Suite A-1
Mashpee, MA 02649

MEMORANDUM

Date: February 12, 2007

To: John Torgan, Save the Bay

From: John Ramsey

Subject: Weaver's Cove Energy LNG Project, SFEIR Review

As requested, Applied Coastal Research and Engineering, Inc. (Applied Coastal) has reviewed the Weaver's Cove Energy LNG Project Supplemental Final Environmental Impact Report (SFEIR) dated June 15, 2006. In general, our review comments are limited to the modeling information presented within the SFEIR, as well as the proposed sediment/water quality monitoring. Much of the detailed modeling information is contained in previous versions of the environmental permitting documents or in reports/papers not related to the proposed LNG project.

As noted throughout the SFEIR, there have been significant hydrodynamic and water quality modeling efforts performed for a wide-range of projects within the Mount Hope Bay estuarine system. According to the SFEIR, the hydrodynamic model that simulates tidal circulation within the estuary has undergone extensive testing and has been calibrated and validated for this region. Based on the numerous publications regarding the baseline hydrodynamic model, it appears that circulation patterns associated with present conditions are accurately simulated by WQMAP. The refined modeling associated with this project consisted of increased grid resolution in the vicinity of the proposed dredging. This refined hydrodynamic model was calibrated with current measurements located at the proposed terminal site.

Results from the hydrodynamic model (WQMAP) were used to drive a sediment transport model (SSFATE), jointly developed by Applied Science Associates and the U.S. Army Corps of Engineers. The SFEIR included a paper presented at the 36th TAMU Dredging Seminar in 2004, where the SSFATE model was applied to sites in the Chesapeake Bay and Florida (Swanson, et al., 2004). While this paper provides site-specific calibration information regarding the use of SSFATE at two sites, the calibration coefficients utilized in these examples cannot simply be applied to other sites. Specifically, the sediment release rate of 0.5% may not be appropriate for sites with different bottom sediment characteristics and/or hydrodynamic conditions. The SFEIR indicated that a range of sediment release rates (0.22% to 1.32%) were incorporated into the model to simulate the extent of impacts associated with the proposed dredging. As a numerical exercise, this type of sensitivity analysis provides valuable information for assessing a range of possible impacts. However, it would be appropriate to include even larger values of sediment release rates that would be more consistent with empirically derived release rates of the proposed dredging technique. In this manner, the upper bound of model-predicted suspended sediment concentrations could be considered to be conservative.

The selection of model parameters in SSFATE relates directly to both the proposed mixing zones and the appropriate turbidity monitoring for the project. The Massachusetts DEP has indicated that the 1,000 foot mixing zone is excessively large. Therefore, it would be appropriate to limit the mixing zone to a smaller area (perhaps 100 meters) to ensure that water quality impacts associated with the dredging do not become excessive. According to the SSFATE model results described in Section 4 of the SFEIR, the model is typically conservative and tends to over-predict TSS concentrations and under-predict particle settling. If this is the case, the actual mixing zone during dredging should be significantly lower than the mixing zone predicted by the model. This smaller mixing zone should be utilized as the basis for Massachusetts DEP restrictions on turbidity relative to reference/background. Based on model predictions (Figure 4-1 of the SFEIR), TSS concentrations near the Turning Basin site are approximately 3-to-4 times higher for a 100 meter (330 feet) mixing zone than for the 1,000 foot mixing zone proposed.

In addition to suspended sediment concentration, the dissolved oxygen (DO) levels within the estuary are also a concern. During the summer months, system-wide hypoxia occurs within Mount Hope Bay. The limited proposed dredging along much of the navigation channel would have a negligible impact on DO levels within this region. However, the significant "bank-to-bank" deepening required for creation of the Turning Basin could exacerbate DO problems within the estuarine system. Since DO levels are related to water temperature, salinity, vertical mixing, and presence of organic matter, dredging of a relatively deep hole may cause further reductions in DO concentrations. Specifically, deepening of the channel and turning basin will directly influence salinity levels and possibly stratification characteristics of the estuarine system. From a long-term water quality perspective (related to both water column and benthic habitat), an analysis of dredging impacts on DO levels should be performed.

As described above, the baseline hydrodynamic model can be expected to accurately simulate water circulation within the Mount Hope Bay/Taunton River estuarine system. However, secondary processes are more difficult to model accurately, since they often depend on multiple, often inter-related, variables. For the Mount Hope Bay/Taunton River system, suspension and transport of fine-grained materials is modeled by SSFATE. Although the model has been effectively calibrated for other regions (specifically, Chesapeake Bay and western Florida), a true calibration of the model for the Mount Hope Bay system would require a significant *in situ* data collection effort. Therefore, it may be most appropriate to utilize conservative assumptions for sediment release rates associated with the proposed dredging effort. Water column dissolved oxygen levels also may be a long-term concern as a result of the proposed deepening. Proposed alterations of the system bathymetry may allow higher salinity water to propagate further upstream, possibly enhancing stratification and exacerbating DO problems within the estuary. The existing three-dimensional hydrodynamic model should be utilized to assess long-term changes to circulation and stratification. Based on this modeling, the project proponent should indicate whether this alteration will have a long-term beneficial or adverse impact to water quality in the vicinity of the Turning Basin.

Howard, Mike

From: Howard, Mike
Sent: Wednesday, April 25, 2007 8:35 PM
To: 'Lehan, Richard (DEP)'; 'Chin, Ken (DEP)'; 'Szal, Gerald (DEP)'; 'Philip.Weinberg@State.MA.US'; 'DavidC.Noonan@State.MA.US'; 'Langley, Lealdon (DEP)'
Cc: 'Barry Fogel'
Subject: RE: Weaver's Cove Draft Field Verification Plan for SSFATE Modeled Plume

Attachments: DRAFT Field Verification Plan of SSFATE Modeled Plume 4-25-07.pdf

Gents,

For your review. See you tomorrow.

Mike

DRAFT Field
Verification Plan ...

From: Howard, Mike
Sent: Wednesday, April 25, 2007 2:52 PM
To: Lehan, Richard (DEP); 'Chin, Ken (DEP)'; 'Szal, Gerald (DEP)'; 'Philip.Weinberg@State.MA.US'; 'DavidC.Noonan@State.MA.US'; Langley, Lealdon (DEP)
Cc: 'Barry Fogel'
Subject: Weaver's Cove - ASA Response to ACRE Memorandum

Folks,

As promised, here is Weaver's Cove/ASA response to the ACRE memorandum. We are working hard on the plume verification monitoring plan and we expect to have a draft of that plan emailed to you later today.

Please call me with any questions.

Thanks, Mike

<< File: Weaver's Cove-ASA 4-25-07 Response to ACRE Ltr .pdf >>

Michael Howard, Manager - Ecological Sciences
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DRAFT
Weaver's Cove Energy, LLC
Verification of SSFATE Modeling; Predicted Extent of
Dredging Induced Suspended Sediments in the Turning Basin and S-Bend

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List of Figures

VERIFICATION OF SSFATE MODELING; EXTENT OF DREDGING INDUCED SUSPENDED SEDIMENTS IN THE TURNING BASIN AND THE S-BEND

1.0 Overview

During the NEPA and MEPA review processes, Weaver's Cove Energy LLC ("Weaver's Cove") provided SSFATE modeling results that predicted that the cross-sectional area(s) of elevated, dredge-induced suspended sediments would be limited in extent. The SSFATE model was co-developed by Applied Science Associates ("ASA") and the U.S. Army Corps of Engineers Research Center in Vicksburg. The model has been validated via previous field studies in estuarine and coastal waters.[1] However, to verify that actual in-river extent of elevated dredge induced suspended sediments are consistent with cross sectional areas predicted by the SSFATE modeling, Weaver's Cove is proposing to conduct a verification program during the initial stages of dredging in the Turning Basin and in the S-Bend. The verification program will be based on measurement of total suspended solids ("TSS").

For purposes of the verification program, the area of elevated suspended sediment will continue to be defined as those locations where TSS is 10 mg/l or more above background. More specifically, the extent of the river cross section areas affected by dredge-induced elevated suspended sediment levels will be compared to the appropriate model-predicted cross section areas depicted on the attached Figure D. For purposes of this measurement program, it is proposed that a cross-section area within a margin of +25% will be deemed consistent with the model-predicted cross section area.

It is intended that the modeling verification program will be conducted in the first season for dredging of depositional (maintenance) sediments in the Turning Basin and in the S-Bend. These areas have been shown to have the largest predicted cross section areas of elevated, dredging induced suspended sediment levels (14% of the river cross section in the Turning Basin, % in the S-bend). Affected cross sections for the other dredging elements are much smaller because the dredging production rates are lower and in the case of the Turning Basin native sediments, the coarse materials settle more quickly. The attached Figure 1-1, depicts the proposed dredging elements.

The model verification program will be conducted as soon as practicable in the first dredging season following the achievement of steady state dredge operations at or near the modeled production rate. Weaver's Cove is proposing to conduct a total of twelve sampling events - six in the Turning Basin and six in the S-Bend. In the Turning Basin, sampling will be conducted for slack tide, flood tide and ebb tide conditions. In the interest

---

[1] Swanson, J.C., Isaji, T., Clarke, D., and Dickerson, C., Simulations of Dredging and Dredged Material Disposal Operations in Chesapeake Bay, Maryland and Saint Andrew Bay, Florida. Presented at WEDA XXIV/36th TAMU Dredging Seminar; July 7-9, 2004, Orlando, Florida.

of repeatability, this sampling sequence will be done twice (a total of six sampling events). The same process will be used in the S-Bend.

The physical monitoring program described herein will not be repeated in subsequent dredge seasons if compliance is shown with the modeled cross sections (cross-section area within +25%). However, should the physical monitoring not show compliance with the previously modeled cross section area, the operational restrictions outlined in Section 4.0 below will be implemented. In addition, the model verification effort will be extended to the Turning Basin native sediments during the second dredging season.

2.0 Physical Measurement Program

Once the dredging operations have reached a steady state condition, the physical measurement program will get underway. Should unusually severe weather events occur (i.e., sustained heavy precipitation as may be encountered with a passing hurricane), sampling would be delayed until river conditions return to more normal levels. Lastly, the scheduling of the field program is subject to weather conditions which will allow for safe operation of small boats in close proximity to dredges, barges and support vessels.

Background TSS samples will be collected at points well upstream and downstream of the dredging operations. Other river data will be accessed from the PORTS buoy south of the S-Bend. An acoustic Doppler current profiler ("ADCP") will provide basic location information for the verification program. The ADCP measures acoustic backscatter throughout the water column by detecting suspended particle material. The ADCP will be used to define the general location of the dredge-induced sediment "plume".

More specifically, a monitoring vessel will transect the suspended sediment plume along a survey line across the river (perpendicular to the tidal flow) during dredging operations. The ADCP backscatter signal will be viewed in real-time on a computer monitor, in order to identify the general three-dimensional periphery of the plume. This ADCP information will then be used to position the TSS sampling locations (in the horizontal and vertical).

Once the general periphery of the sediment plume is located in the horizontal and vertical using the ADCP, water samples will be collected surrounding these locations to bracket with greater specificity the area where TSS levels are 10 mg/l above background. A sufficient density of samples (horizontal and vertical) will be collected to accurately characterize the plume cross section (see Figure [TBD], Conceptual Sample Transects and Locations). If necessary, more than one collection boat will be used in order to gather reasonably contemporaneous samples.

For sampling under all tide stages (slack, flood, ebb), dredge operations may stop for a brief period of time while the samples nearest the dredge bucket are safely collected. When sampling under flood tide conditions, the dredge and scow will need to be positioned downstream of the area being dredged, so as not to block access to the "plume" area.

Conversely, when sampling under ebb tide conditions, the dredge and scow will need to be positioned upstream of the area being dredged. It should also be recognized that sampling of the slack tide condition will, of necessity, be limited by the presence of the dredge and scow in a portion of the expected circular plume area.

The water samples will be taken to a state certified laboratory for analysis of TSS and a 36 hour turn-around time will be requested. As soon as the sample results for each sample event are available from the lab, the results will be plotted, the plume will be mapped, and the cross sectional area will be computed. The results for each sample event will be transmitted electronically in a format to be mutually agreed upon by DEP and Weaver's Cove. Upon completion of the entire verification program, a full report will be compiled and provided.

3.0 Exceedance of Modeled Cross Sectional Area of Plume

If the measured cross sectional area exceeds the model-predicted cross sectional area by more than +25% in the Turning Basin, Weaver's Cove will take one or more of the following corrective actions within 24 hours of receipt of the confirming data:

1. Increase bucket cycle time (hence reducing the dredging rate); or

2. Reduce bucket capacity (hence reducing the dredging rate); or

3. Restrict dredging during slack tide periods (ebb and flood tides provide more rapid dispersion):

Within 72 hours of implementation of corrective action, the verification program for the Turning Basin will be repeated and the results compiled and provided to DEP. If the initial corrective action does not demonstrate that the cross sectional area is consistent with the model (+25%), Weaver's Cove will take further corrective action and re-test. Should this re-test also not show a plume consistent with the modeled cross section, the dredging effort in the Turning Basin will be halted for 2 days to allow time for Weaver's Cove and DEP to assess the data and agree on an appropriate course of action.

The same corrective action logic will apply separately for the S-Bend verification program.

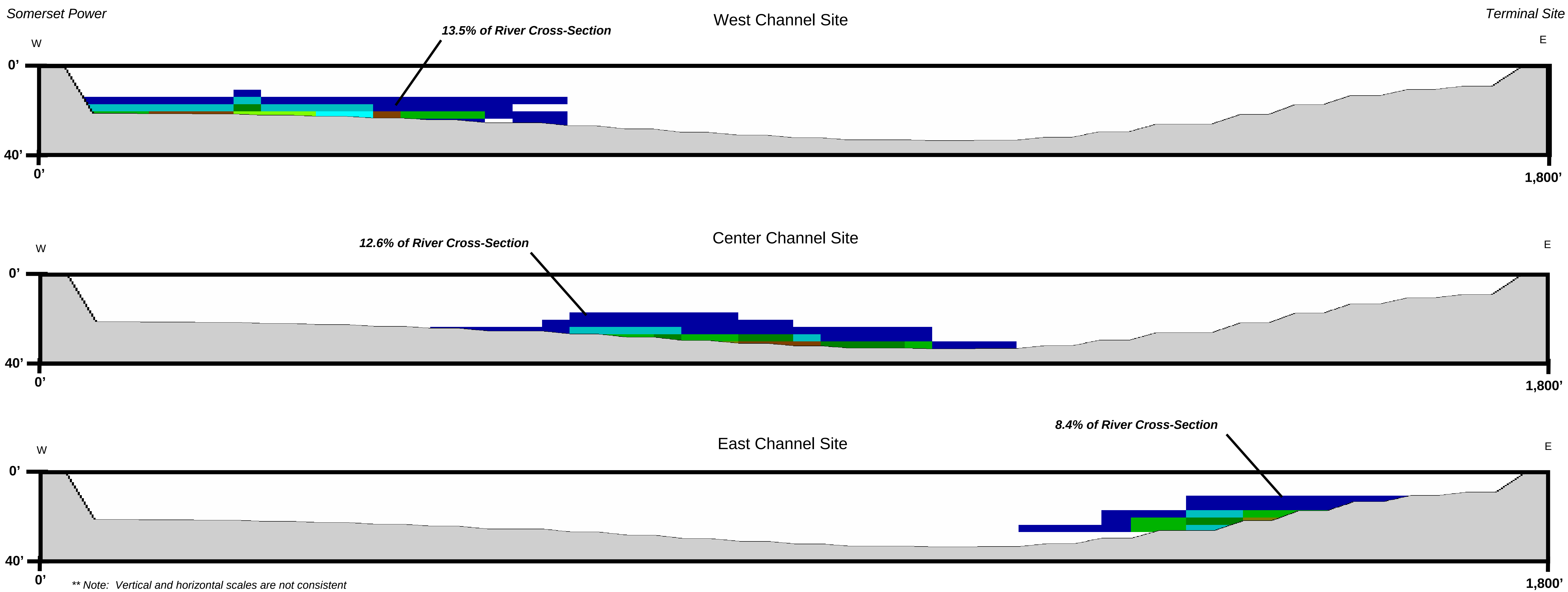
Further, if the Turning Basin verification program does not demonstrate that the actual in–river area of dredge-induced elevated suspended sediment levels is consistent with the modeled cross sections (+25%), the verification program will also be carried out for the dredging of **native sediment** in the Turning Basin (likely in season 2).

4.0 Reporting Requirements

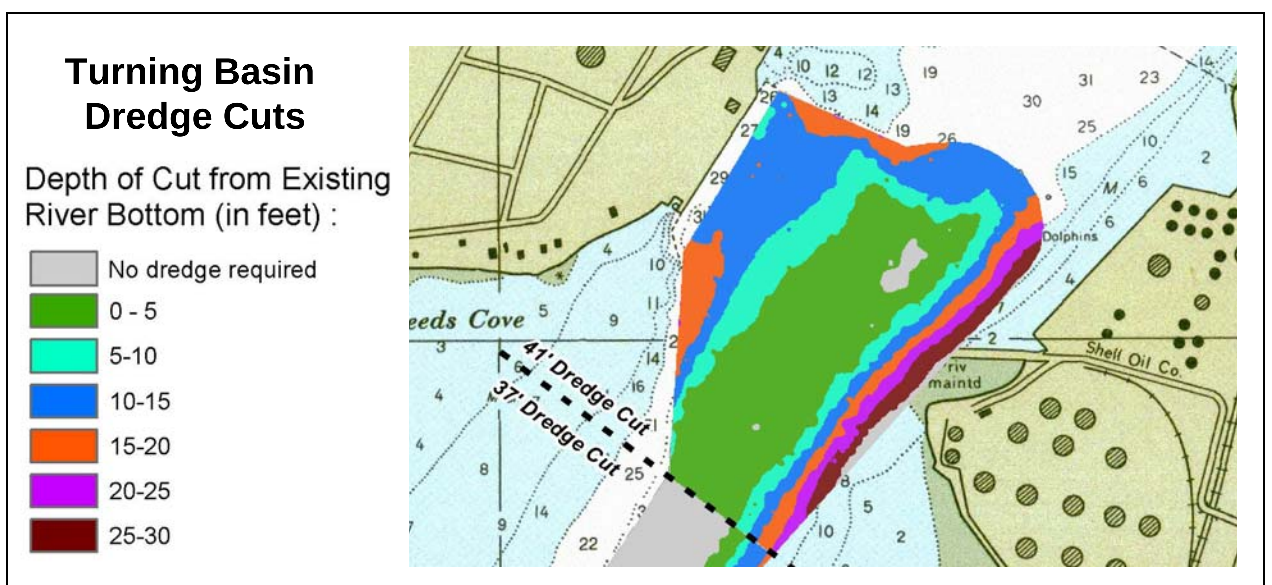
Verification data will be incorporated into a survey report for each monitoring event and will include the following elements.

- All monitoring data results will be forwarded to the DEP within 72 hours after the completion of the field monitoring event.
- Survey log noting the timing of events and relevant information. The dredge equipment, bucket size, production rates, dredged material characteristics, depth of cut, depth of water, downtime, and other ships/tugs working in the vicinity will be recorded and considered when interpreting data.
- Overview figure showing the locations of monitoring and sampling.
- Profiles of ADCP backscatter measurements supporting plume definition and sampling locations.
- Profiles of water quality measurements characterizing the water column TSS.
- Brief discussion of results (with applied operational restrictions if a project specific criterion has been exceeded).

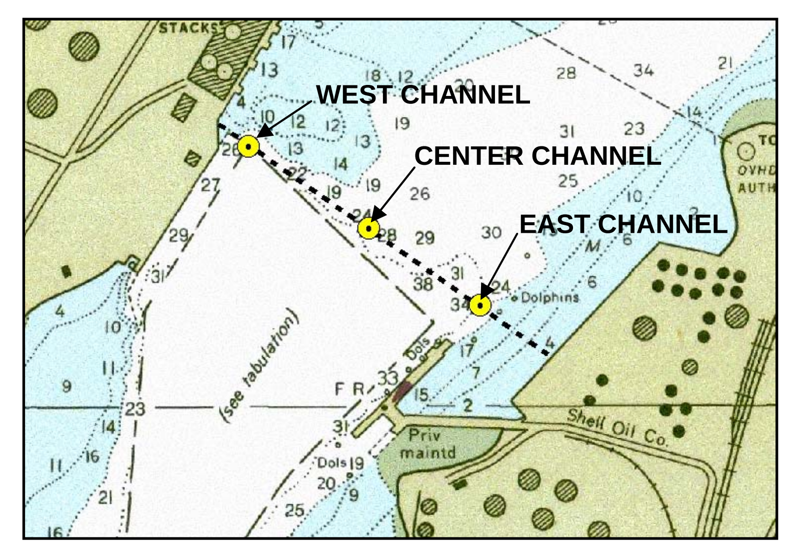
Attachment A - Figures



** Note: Vertical and horizontal scales are not consistent



MODELED PLUME LOCATIONS:



KEY TO PLUME CONCENTRATIONS:

g/m^3 mg/L
10 -> 20
20 -> 30
30 -> 40
40 -> 50
50 -> 60
60 -> 70
70 -> 80
80 -> 90
90 -> 100

Figure D
SSFATE Modeling – Cross-Sectional Areas

APPLIED SCIENCE ASSOCIATES, INC.
Epsilon

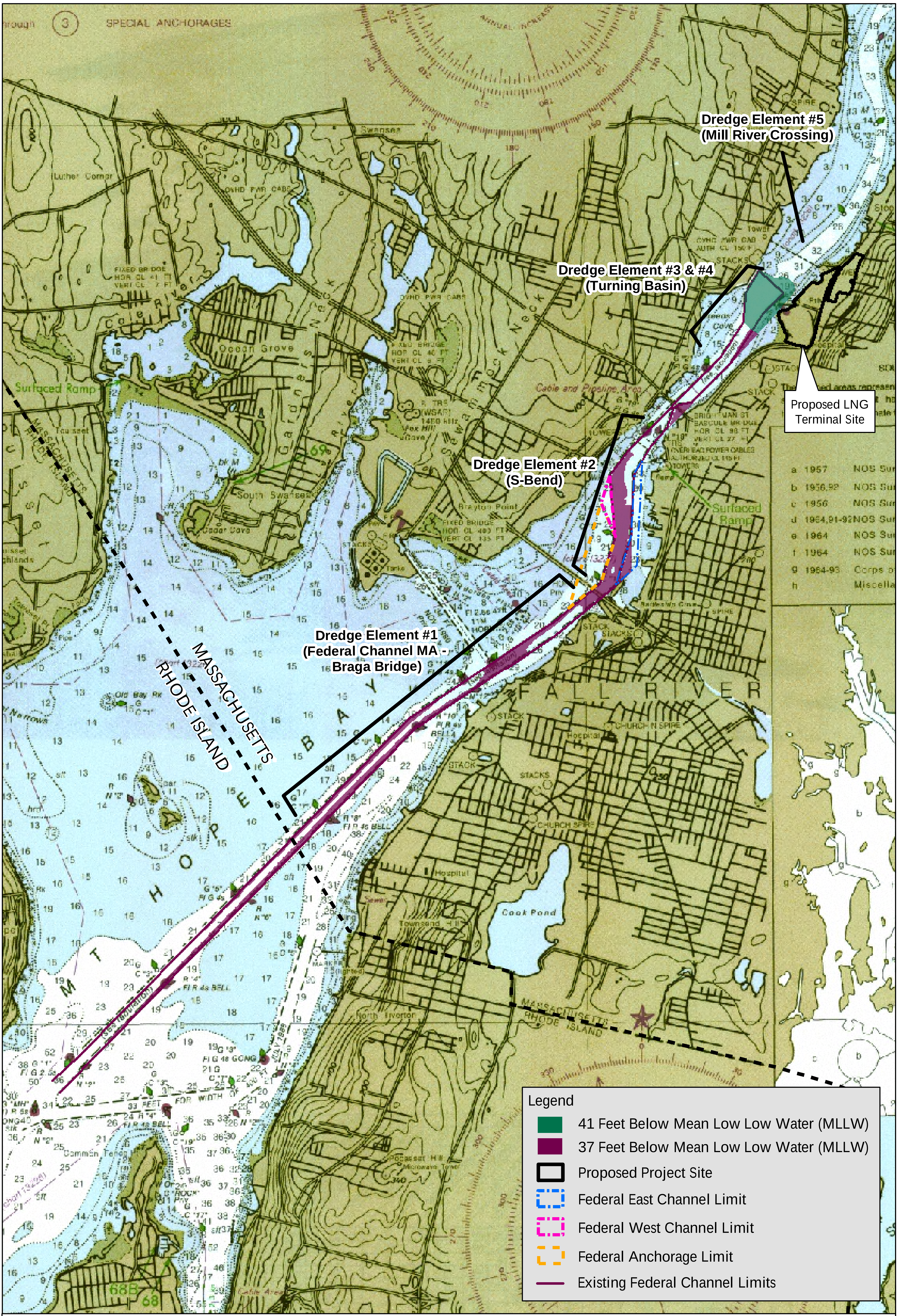


Figure 1-1
Locus Map of Proposed LNG Terminal Site
and Approximate Limits of Proposed Dredging

Basemap: NOAA Nautical Chart, MassGIS

Scale 1:36,000
1 inch = 3,000 feet

1,500 0 1,500 3,000
Feet

Weaver's Cove Energy, LLC
Mill River Pipeline, LLC

Prepared by Epsilon Associates, Inc

G:\Projects\Fall_Riv\79001\WQ_2-24-06\fig1-1_dredge_nautical_11x17.mxd

Howard, Mike

From: Howard, Mike
Sent: Thursday, May 03, 2007 4:05 PM
To: 'Chin, Ken (DEP)'; Lehan, Richard (DEP); Langley, Lealdon (DEP); 'Philip.Weinberg@State.MA.US'
Cc: 'Barry Fogel'

Attachments: 5-3-07 WCE Response to Late Filed RIAG Comment Ltr.pdf

Gentlemen,

Attached please find a copy of Weaver's Cove response to the late filed comment letter by the Rhode Island Attorney's General Office on Weaver's Cove Water Quality Certification application for dredging. Hard copies are in the mail.

Please call me with any follow-up questions.

Thanks, Mike

5-3-07 WCE
{esponse to Late Fi.

Michael Howard, Manager - Ecological Sciences
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Epsilon
ASSOCIATES INC.

#79001/WeaversCove/ResponsetoComments/CvrLtr

May 3, 2007

Mr. Ken Chin
Massachusetts Department of Environmental Protection
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978 897 7100
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Subject: **Weaver's Cove Energy, LLC – Response to Letter Dated January 30, 2007, from Rhode Island Attorney's General Office on Weaver's Cove Massachusetts Water Quality Certification Application for Dredging (BRP-WW-07 & BRP-WW-10), Transmittal #W05-0847.**

Dear Mr. Chin:

On January 30, 2007, the Rhode Island Attorney's General Office ("RIAG") sent the Massachusetts Department of Environmental Protection ("MADEP") a letter seeking to submit written comments on the referenced application. As the public comment period on the referenced application closed on January 3, 2007, the RIAG ignored that deadline and filed the letter one month too late.

Under 314 CMR 9.05(3), MADEP is required to consider comments filed *during* the public comment period. Consequently, MADEP may properly exclude from consideration in this proceeding any late-filed comments such as those contained in the RIAG letter. Neither MADEP nor Weaver's Cove is obliged to be burdened by reviewing comments filed after the prescribed deadline, and Weaver's Cove has no interest in burdening MADEP with more documents that restate information and data already filed. However, absent an indication that MADEP has rejected the RIAG's late-filed comments, Weaver's Cove has elected to provide these written responses to the RIAG's comments in order to ensure that MADEP has information in its files addressing the RIAG letter.

If you have any questions regarding this submittal, please do not hesitate to contact me at (978) 461-6247 or via email at mhoward@epsilonassociates.com.

Sincerely,
EPSILON ASSOCIATES, INC.

Michael D. Howard
Manager, Ecological Sciences

Encl.
CC: Phil Weinberg, DEP
Rich Lehan, Esq., DEP
Lealdon Langley, DEP
Ted Gehrig, Weaver's Cove Energy, LLC
Barry Fogel, Esq., Keegan Werlin LLP

Attachment A – Weaver's Cove Response to Late Filed Comment Letter from RIAG

State of Rhode Island and Providence Plantations

DEPARTMENT OF ATTORNEY GENERAL
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Patrick C. Lynch, Attorney General

January 30, 2007

Mr. Ken Chin
Massachusetts Department of Environmental Protection
Division of Wetlands and Waterways
One Winter Street
Boston, MA 02108

Re: **CWA § 401 Water Quality Certification Application Filed by Weaver's Cove Energy, LLC BRO WW07 and BRP WW10**

Dear Mr. Chin:

We submit these comments on behalf of Patrick C. Lynch, Attorney General of the State of Rhode Island ("RIAG"), for your consideration. The RIAG files these comments relative to the pending application of Weaver's Cove Energy LLC ("WCE") for a water quality certification under Section 401 of the federal Clean Water Act.[1] 33 U.S.C. § 1341. As you know, WCE is proposing to dredge approximately 3 million cubic yards of material from Massachusetts and Rhode Island waters. Given the large RIAG.01

[1] On October 25, 2006 the RIAG submitted comments to the Rhode Island Department of Environmental Management ("RIDEM") in response to WCE's pending application for a CWA § 401 water quality certification related to the proposed dredging of approximately 230,000 cubic yards of material from Rhode Island waters located within Mount Hope Bay. Those comments submitted in opposition to WCE's dredging proposal are attached and incorporated herein. RIAG.02

quantity of dredging in Massachusetts' waters, coupled with the fact that Mount Hope Bay is already failing to meet applicable Massachusetts and Rhode Island water quality criteria as a result of the impacts associated with Brayton Point Station, MADEP should deny WCE's application for a water quality certification as a matter of both State and Federal law. RIAG.01 (continued)

Furthermore, while the vast majority of the dredging activity proposed by WCE will occur in the Massachusetts' portion of Mount Hope Bay and the Taunton River, the impacts to water quality that are associated with such a proposal obviously will not respect state boundaries. Since two-thirds of Mount Hope Bay belongs to Rhode Island, any water certification decision by Massachusetts or Rhode Island must consider the impacts to the Bay as a whole. Moreover, any water quality determination for the proposed dredging project must also consider the cumulative impacts to the Bay from other points of origin, including Brayton Point Station. RIAG.03

MADEP's Role Under the Clean Water Act Is Broad and Comprehensive

The overall objective of the federal Clean Water Act ("CWA") is expressed in terms of a national goal. Specifically, Congress provided that it is our national goal to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a), CWA § 101(a). To accomplish this national goal Congress required, among other things, that there be achieved "not later than July 1, 1977, any more stringent limitation, including those necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any State law or regulations (under authority preserved by section 1370 of this title) or any other Federal law or regulations, or required to implement any applicable water quality standard established pursuant to this chapter." 33 U.S.C §1311 (b)(1)(C), CWA § 301(b)(1)(C).

The goals of the CWA, as identified in §§ 101 and 301, respectively, make clear that MADEP's authority to impose more stringent water quality limitations is not only an authority and right preserved to it and promoted by Congress, but a mandate. Congress confirmed that, "for more than two decades, federal legislation in the field of water pollution control has been keyed primarily to an important principle of public policy, **the States shall lead** the national effort to prevent, control, and abate water pollution." **(emphasis added)** *S.Rep. No. 414, 92nd Cong., 2nd Sess. 2 (1972), reprinted in 1972 U.S.C.C.A.N. 3668.* In order to provide full support to the states' respective roles in preventing, controlling and abating water pollution, a central focus of the CWA is to preserve the rights of a state of which water quality "may be affected" by a permit issued under the jurisdiction of either a federal agency or a state agency, or both. Specifically, the CWA provides that:

> ...Whenever such discharge may affect, as determined by the Administrator, the quality of the waters of any other State, the Administrator within thirty days of the date of notice of the application for such Federal license or permit shall so notify such other State, the licensing or permitting agency, and the applicant.... *** Such agency, based upon the recommendations of such State, the Administrator, and upon any

> additional evidence...shall condition such license or permit in such manner as may be necessary to insure compliance with applicable water quality requirements. If the imposition of conditions cannot insure such compliance such agency shall not issue such license or permit.

33 U.S.C § 1341(a), CWA § 401(a)(2).

The CWA, further provides, in part, that:

> Any certification provided under this section shall...assure that any applicant for a Federal license or permit will comply with...any other appropriate requirement of State law set forth in such certification, and shall become a condition on any Federal license or permit subject to the provisions of this section.

33 U.S.C § 1341(d), CWA § 401(d).

In further support of the significance of the states' respective roles in preserving and restoring the Nation's waters, the CWA further provides, in relevant part:

> Except as expressly provided in this Chapter nothing in this chapter shall (1) preclude or deny the right of any State or political subdivision thereof or interstate agency to adopt or enforce ...(B) any requirement respecting the control or abatement of pollution, ...**or other limitation**, ... or (2) be construed as impairing or in any manner affecting any right or jurisdiction of the States with respect to the waters ... of such States.

33 U.S.C § 1370, CWA § 510 **(emphasis added)**.

States have a number of interests in maintaining the full strength of their respective state water quality standards. First, adherence to water quality standards ensures that the states' designated uses for a particular water body will be maintained and not degraded to a point where the states' sovereign interests have eroded. Second, adherence to the federal requirement to consider more stringent state water quality standards ensures a strong "national floor" of water quality controls. These national requirements, approved by EPA, prevent States from relaxing their own standards and enforcement efforts in an effort to gain a perceived economic or market advantage in the siting of industrial, commercial or other facilities at the economic or environmental expense of other States.

<u>Mount Hope Bay Is Already Failing To Meet Rhode Island's And Massachusetts' Water Quality Criteria And Thus Cannot Support The State's Designated Uses, And Further Impacts To Mount Hope Bay Are Therefore Not Authorized Under Federal Or State Law</u>

The Mount Hope/Narragansett Bay Watershed has an area of 112 square miles and encompasses all or part of eight municipalities, including portions of the Cities of Fall River and Attleboro. The Narragansett Bay Estuary, which includes Mount Hope Bay and the Taunton River, was designated an Estuary of National Significance by the Environmental Protection Agency in 1987.[2] However, despite its regional significance and ecological importance, Mount Hope Bay has seen a

RIAG.04

[2] This vital water resource also supports numerous wildlife and marine species, including the Kemp's Ridley Sea Turtle, a federally-endangered species of sea turtles.

RIAG.05

drastic decrease in the quality of its environment over the past three decades.

In 1986, fisheries biologists from the Rhode Island Department of Environmental Management (RIDEM) were startled at the results of monthly fish surveys taken in Mt. Hope Bay. Eighteen of twenty-one key species experienced dramatic population reductions, and several species had virtually disappeared (including winter flounder, which suffered an 87% decline).[3]

RIDEM fisheries scientists issued a report in 1996 documenting the declines in fish populations. The report identified Brayton Point Station, situated at the head of the bay in Massachusetts, as the "most likely" cause of the reductions in fish populations. Brayton Point Station had been allowed to discharge water (thermal pollution) up to 23 degrees higher than the bay's ambient temperature, with a maximum cap at 95 degrees Fahrenheit. At the same time, Brayton Point Station was withdrawing up to 1.4 billion gallons of water per day. The report pointed to changes in the plant's operating permit in 1985 that allowed a 30% increase in the amount of water drawn into the plant for cooling purposes.

RIAG.04 (Continued)

Until the terms of the new October 6, 2003 permit are implemented, Brayton Point Station continues these operational practices. Indeed, its current cooling water practices cause the plant to

[3] *In re: Dominion Energy Brayton Point LLC, Environmental Appeals Board of the U.S. Environmental Protection Agency, Docket No. NPDES 03-12 (Decision at 153) (February 1, 2006).*

exchange approximately the entire volume of Mt. Hope Bay every two months.[4] Brayton's operations have raised the average summer and fall bay temperatures by as much as 2 degrees Fahrenheit, and the effects of the thermal pollution are significant as a result of the annual release of an estimated 42 trillion British thermal units into Mount Hope Bay and its tributaries.[5]

The RIAG respectfully submits that MADEP must factor the impacts Mount Hope Bay form the Brayton Point Station into its decision regarding WCE's proposed dredging. Mount Hope Bay has yet to recover from the impacts of the existing operational practices of Brayton Point Station, and the diverse species mix once found in Mount Hope Bay has yet to return. Unless and until the more stringent permit limits are imposed at Brayton Point Station, the plant's operations will continue to annually consume and discharge billions of gallons water at much higher temperatures than the Bay can withstand, with the resulting consequence that the estuarine ecosystem will continue to suffer huge decreases in productivity. Therefore, MADEP's review of WCE's proposed dredging must take Brayton's impacts into consideration since Mount Hope Bay is already suffering from decades of ecological abuse.

RIAG.04
(Continued)

The 2006 decision of the United States Environmental Appeals Board with respect to Brayton's NPDES permit specifically validated EPA

[4] *In re: Dominion Energy Brayton Point LLC, Environmental Appeals Board of the U.S. Environmental Protection Agency, Docket No. NPDES 03-12 (Decision at 8) (February 1, 2006).*
[5] *Id. at 17.*

Region I's conclusions about the impacts of Brayton Point Station on Mount Hope Bay. The EAB made the following determination:

> The Region concluded that Rhode Island's [water quality standards] 'are being violated as a result of entrainment and impingement by the current [Brayton Point Station Cooling Water Intake Structures] and that Closed-Cycle Entire Station option is the only alternative currently under consideration that will satisfy these standards in the future . . . Further, as we also summarized in the previous section, the Region found significant effects throughout Mount Hope Bay, not just in the Massachusetts segment of the waterbody.[3]

RIAG.04 (Continued)

Because the waters of Mount Hope Bay are already failing to meet applicable state water quality standards, both in Rhode Island and Massachusetts, as a result of the destructive operations at Brayton Point Station, the additional adverse impacts to the Bay associated with the proposed massive dredging project will surely further contribute to the delayed attainment of water quality standards and therefore should not be permitted.

The Resulting Negative And Unnecessary Effects On Fish And Wildlife Resources In Mount Hope Bay And The Taunton River Dictate That MADEP Deny WCE's Water Quality Certification

The proposed dredging will cause at least three major classes of water quality impacts: (1) the suspension of sediments; (2) burial of

RIAG.06

[3] EAB Remand Order Re: Dominion Energy Brayton Point L.L.C., NPDES 03-12, slip op. at 202 (February 1, 2006).

habitat at the disposal site; and (3) the excavation of a deep channel that is more likely to become seasonally hypoxic than existing conditions.[4] The impacts are described in the attached affidavit of John Torgan from Save the Bay and are summarized as follows:

> First, the dredging itself will suspend sediment into the water column. Some of the sediments in the vicinity of the project site are known to be contaminated with mercury. The applicant has waived testing of the most contaminated sediments around the project site opting for upland disposal, but Save The Bay is concerned that it may reach concentrations that exceed water quality standards during and immediately following dredging. This could harm migratory fish.[5]

RIAG.06 (Continued)

MADEP must ensure that the proposed dredging does not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the designated critical habitat of a federally listed species. The list of endangered species in the Mount Hope Bay resource includes 14 animals and 2 plants, including the Leatherback Sea Turtle, Hawksbill Sea Turtle, Shortnose Sturgeon, the Finback Whale, and the Humpback Whale.

RIAG.07

The proposed dredging will permanently impact 191 acres of river bottom, including 144 acres of "relatively shallow habitat specifically identified as spawning beds for winter flounder."[7] The proposal will have a detrimental impact on many species including fourteen fin fish species

RIAG.08

[4] See affidavit of John Torgan, attached hereto.
[5] *Id.*
[7] Id.

that are subject to protection under both federal and state fisheries management programs, including alewife, American shad, hickory shad, gizzard shad, rainbow smelt, white perch, striped bass, American eel, winter flounder, Atlantic menhaden, tautog, bluefish, and a Massachusetts endangered species, Atlantic sturgeon. RIAG.09

If the proposed dredging project is authorized by MADEP, many shellfish resources will also be adversely affected, such as the northern quahog, American oyster and soft-shell clams. It is still not clear that Mount Hope Bay will ever recover from environmental degradation associated with the operation of the Brayton Point Station, but additional impacts from WCE's proposed dredging activities would permanently damage any prospect for recovery. RIAG.10

The Taunton River's Pending Designation As a National Wild and Scenic River Should Be Factored Into MADEP's Water Quality Review Determination

MADEP must also recognize the broad efforts and investment to restore the Taunton River and Mount Hope Bay to the thriving resource it once represented: RIAG.11

> The Taunton River estuary is unique. It is the only river of its kind in this region of the world. Over its forty-mile course, there are no dams. This natural hydrology creates a classic estuary, where fresh water floats on salt water in a wedge moving with the tide. It is home to 69 state-listed threatened or endangered species, and boasts the highest freshwater mussel diversity in Massachusetts. This system is particularly important as a nursery area for fish, and is designated as essential fish habitat for 14 federally-managed species including windowpane flounder, winter flounder, red hake, Atlantic mackerel, black sea bass, bluefish, scup,

Atlantic herring, scup and summer flounder. It provides the largest anadromous fish runs (herring and alewives) in the Narragansett Bay watershed, with populations of more than 1 million fish.[8]

It should be of great significance to MADEP that there is an ongoing effort to designate the Taunton River as a National Wild and Scenic River through the U.S. National Park Service. The Taunton River Stewardship Plan is the product of an intensive, four-year study of the 40-mile long Taunton River corridor and many of its key tributaries all the way down to the entrance to Mount Hope Bay. According to the Study, the Taunton River is probably the "most diverse an intact coastal riverene ecosystem in all of Southern New England."[10] It is the largest freshwater contributor to the Narragansett Bay. Some of the outstanding attributes of the Taunton River corridor include: RIAG.11 (Continued)

- The longest undammed coastal river in New England
- Over 154 species of birds and 45 species of fish, including the bald eagle and the globally rare endangered Atlantic sturgeon
- More than 360 identified plant species, including 3 globally rare species, Long's bittercress, Long's bulrush and Eaton's beggar ticks
- Globally rare freshwater and brackish tidal marsh habitats
- The larges alewife run in the state including the Nemasket River with headwaters at the Assawompset Ponds, the largest natural lakes in Massachusetts
- Habitat for the globally rare bridle shiner and rainbow smelt; recently listed by NOAA as a species of concern.[11]

On July 5, 2004, USDOI filed formal comments with the FERC indicating that it could not support the Weaver's Cove project. USDOI

[8] Comments of Save the Bay to ACOE (November 20, 2004) (Emphasis supplied).
[10] See Taunton River Stewardship Plan, attached hereto, at page 5.
[11] See Taunton River Stewardship Plan, at 6.

and USFWS indicated serious concerns about "unavoidable adverse site impacts related particularly to the enlargement of turning basin and development of the Weaver's Cove site."[12] USDOI cited the permanent loss of 11 acres of winter flounder habitat and 1.15 acres of saltmarsh and intertidal/subtidal habitat. Most striking was USDOI's admonition concerning the fate of the NPS Wild and Scenic Rivers Designation: RIAG.12

> As of June 6, 2005, the legislative bodies of nine out of 10 communities abutting the main-stem of the Taunton River voted to endorse the Taunton River Stewardship Plan and seek Federal Designation as a Wild and Scenic River. . . . This showing of strong local support is the final step required to judge the suitability for Federal designation. . . . The protection of the outstanding fishery value of the Taunton River was highlighted as a critical issue related to the potential Wild and Scenic River designation.[13]

The proposed dredging and the creation of a deep water turning basin would permanently degrade these valuable fishery resources and compromise the Wild and Scenic River designation. As explained by one expert:

> The creation of a deep channel and turning basin will compound and exacerbate existing low dissolved oxygen conditions in the river and likely lead to chronic hypoxia in the bottom waters. Presently, these shallow areas outside the dredged channel are typically not hypoxic, yet recent studies confirm that hypoxic and anoxic conditions do exist seasonally in the dredged channel in Mount Hope Bay and the Lower Taunton River.[The deepening of the Taunton River in the turning basin has a high likelihood of causing RIAG.13

[12] Comments of United States Department of Interior to FERC regarding final environmental impact statement (July 5, 2005).

[13] Comments of United States Department of Interior to FERC regarding final environmental impact statement (July 5, 2005).

these low oxygen conditions across the entire river in the vicinity of the project, forcing animals to swim a narrow gauntlet between two coal-fired power plants (Brayton Point, and Montaup) and this LNG facility in order to reach suitable habitat.[14]

RIAG.13 (Continued)

Conclusion

In closing, the RIAG appreciates the opportunity to comment in this matter, and based on the reasons stated herein, strongly urges MADEP to deny the application of WCE for a water quality certification.

Very truly yours,

Paul Roberti
Assistant Attorney General

Terence J. Tierney
Special Assistant Attorney General

Attachments

[14] Statement of John Torgan, Save the Bay, ACOE Comments (December 5, 2005).

Response to Letter Dated January 30, 2007, from Rhode Island Attorney's General Office on Weaver's Cove Massachusetts Water Quality Certification Application for Dredging (BRP-WW-07 & BRP-WW-10), Transmittal #W05-0847.

State of Rhode Island Office of Attorney General (RIAG)

NOTE: *The public comment period on the referenced application closed on January 3, 2007. The RIAG ignored that deadline and the letter was filed almost one month beyond that deadline. Under 314 CMR 9.05(3), the Department of Environmental Protection ("MADEP") is required to consider comments filed during the public comment period. Consequently, DEP may properly exclude from consideration in this permit proceeding any late-filed comments such as those reflected in the RIAG letter. Neither DEP nor Weaver's Cove is obliged to be burdened by reviewing comments filed after the prescribed deadline, and, Weaver's Cove has no interest in burdening DEP with more documents that restate information and data already on file. However, absent an indication that DEP has rejected the RIAG's late-filed comments, Weaver's Cove has elected to provide these written responses to the RIAG's comments in order to ensure that DEP has information in its files regarding how the matters identified in the RIAG letter have been addressed.*

RIAG.01 The RIAG does not articulate any specifics in this comment, let alone scientific evidence, as to why the Water Quality Certification application for dredging in Massachusetts waters should be denied "as a matter of both State and Federal Law". The fact is that this dredging program is conventional for work in a major federal shipping channel and Designated Port Area ("DPA") and will meet applicable performance standards. All of the data and analyses provided by Weaver's Cove demonstrate that this dredging program will be conducted in a manner that will not violate applicable Surface Water Quality Standards, per 314 CMR 9.09(3), and the RIAG has not provided any substantive information challenging that data. The environmental documentation and review process before DEP, the U.S. Army Corps of Engineers ("USACE") and Federal Energy Regulatory Commission ("FERC") relative to the dredging and dredged material management and disposal has been comprehensive and thorough. The record is extensive and contains numerous studies, documents, literature reviews, and independent assessments including, but not limited to, the voluminous Environmental Report submittal to FERC by Weaver's Cove in December 2003; the FERC's Draft and Final Environmental Impact Statements in 2004 and 2005; six MEPA submittals, four-plus years of evaluations by numerous Federal and State agencies; Tiers I, II, and III Evaluations to characterize the dredged material including the thorough evaluation by the USACE and U.S. Environmental Protection Agency ("USEPA") necessary to issue their Suitability

Determination for offshore disposal; a full set of model simulations including a range of conservative inputs and screening thresholds; extensive literature reviews and citations; dozens of interagency meetings; Federal and local public hearings; and, several significant modifications to operational procedures and design to further avoid and/or minimize impacts.

With regard to the RIAG's vague reference to "impacts associated with Brayton Point Station," the record is replete with information: see FR06.10, FR06.11, and FR06.13 in Weaver's Cove March 2, 2007 submittal to MADEP entitled "Response to Public Comments on the 401 Water Quality Certification Application for Dredging Mount Hope Bay – Fall River Harbor Federal Navigation Channel and Turning Basin (BRP WW 07 and BRP WW 10)". The cumulative impacts associated with dredging operations and the ongoing operation of the Brayton Point Station were also addressed during the NEPA and MEPA reviews. See page 4-120 of the FEIS (Attachment J to the March 2nd MADEP submittal).

RIAG.02 Weaver's Cove has filed a separate Water Quality Certification application for dredging with the Rhode Island Department of Environmental Management ("RIDEM") that demonstrates compliance with the Rhode Island Water Quality Regulations and surface water quality standards. RIDEM's review is ongoing. Although the RIAG attached comments here that were filed with RIDEM on that application, those comments are not relevant to this Massachusetts proceeding.

RIAG.03 MADEP and RIDEM each will review the Weaver's Cove applications in the context of their specific regulations. There is no regulatory basis (or explanation by the RIAG) for the suggestion that each state "must consider the impacts to the Bay as a whole". With respect to consideration of cumulative impacts, Weaver's Cove addressed this in the March 2, 2007 Response to Comments submittal to MADEP in the following responses: FR06.09 (prop wash), FR06.10 (ballast water), FR06.11 (ballast water – egg entrainment), FR06.12 (invasive species), FR06.13 (ship operations), and TRWA.02 (dissolved oxygen levels).

NOTE: *On pages 2 through 5 of the RIAG's letter, the RIAG provides a summary of the federal Clean Water Act and purports to explain MADEP's role under that Act. In fact, all the RIAG has done is identify the basic authority of states to adopt water quality criteria that are more stringent than federal criteria. In adopting its state regulations, DEP has exercised that authority, but there is nothing in the RIAG's dissertation that bears any significance to MADEP's review of the application filed by Weaver's Cove.*

RIAG.04 The RIAG's discussion on pages 5 to 8 regarding Brayton Point is another comment that is not relevant to MADEP's review of the application filed by Weaver's Cove. Furthermore, the RIAG offers no support at all for the presumptive conclusion at the end of the comment that "the additional adverse impacts to the Bay associated with the proposed massive dredging project will surely further contribute to the delayed attainment of water quality standards and therefore should not be permitted." Aside from the mischaracterization regarding a "massive project," the RIAG's general conclusion is presented without any analysis or data in support. Also, see FR06.20 (footnote #14) in the March 2, 2007 Response to Comments submittal to MADEP for information regarding the Estuary of National Significance designation by the USEPA and FR06.10, FR06.11, FR06.13 for information pertaining to Brayton Point. The RIAG's general notions also ignore the fact that the proposed dredging will be completed within a three year period.

RIAG.05 With regard to footnote #2 on page 5 in the RIAG comment letter, on February 7, 2006, Ms. Mary Colligan, Assistant Regional Administrator for Protected Resources, NOAA, Gloucester, MA forwarded correspondence to Mr. Ted Lento of the Corps of Engineers, Concord, MA stating (in part), "*No species listed as threatened or endangered under the ESA are known to occur in the Taunton River. Therefore, the dredging portion of this project will have no effect on listed species under NMFS's jurisdiction ... as such, no further consultation is necessary for the issuance of a permit for the dredging and disposal portions of the Weaver's Cove LNG project.*"

Also, on January 9, 2003, the Massachusetts Division of Fisheries and Wildlife provided correspondence confirming that they *"are not aware of any rare plants or animals or exemplary natural communities in the area of this site."*

Copies of these letters were provided in Attachment G to the March 2, 2007 Response to Comments submittal to MADEP.

RIAG.06 Information pertaining to the absence of any adverse impacts from suspended sediment can be found in the following locations in Weaver's Cove March 2, 2007 Response to Comments submittal to MADEP: FR06.17 (sediment data), FR06.09 (prop wash), FR06.17 (sediment data), TRSC.06 (TOY and sediment modeling), DMF.03 (model results), TRSC.11 (shellfish), and NMFS.08 (shellfish).

The RIAG's comment about "burial of habitat at the disposal site" is uninformed and confusing. USEPA and the USACE determined long ago that all of the tested sediments meets the criteria for acceptability for ocean disposal as described in Sections 227.6 and 227.27 of the Ocean Dumping

Regulations, and is suitable for unrestricted ocean disposal in *Federal waters* at either the Rhode Island Sound Disposal Site ("RISDS") or Massachusetts Bay Disposal Site ("MBDS") that have been federally approved under USEPA Region 1/USACE-NAE (2004) guidance.

Both the MBDS and the RISD sites have been the subject of detailed, multi-year environmental review, and have regular management and monitoring programs. For example, the RISDS was the subject of a voluminous Environmental Impact Statement prepared by the USEPA to evaluate and support its designation. The RISDS was designated for disposal of suitable material from Narragansett Bay, including the Taunton and Providence Rivers. The RISDS has an estimated capacity of 20,000,000 cubic yards. In supplementation of the existing federal designation, the FERC FEIS in Section 3.6 (page 3-70), discussed the environmental features at the RISDS and MBDS. Consistent with offshore disposal procedures and practices on the recently completed Providence River and Harbor dredging project, Weaver's Cove would expect to carefully position each scow as directed by the Site Manager. An environmental inspector would accompany each tug/scow. Monitoring of suspended sediment levels would be conducted in accordance with the RISDS Site Management and Monitoring Plan ("SMMP") or the MBDS SMMP, as appropriate.

See TRWA.02 in Weaver's Cove March 2, 2007 Response to Comments submittal to MADEP for information regarding hypoxic conditions (e.g., dissolved oxygen levels).

With regard to mercury levels in the sediment which the RIAG asserts via the "affidavit" from John Torgan of Save the Bay, the record already makes clear that the sediment, river water, elutriate, and biological tissue samples were analyzed for mercury using test protocols approved by the USACE and USEPA. The concentration of mercury reported in these site specific tests included all forms of mercury, including the concentration of methylmercury (an organic form of mercury). Also, Weaver's Cove has not "waived testing" of any sediments.[1]

[1] Sediments located in the immediate vicinity of the existing wooden pier at the LNG Terminal site were not analyzed in the initial USACE/USEPA Suitability Determination for offshore disposal. A Tier III Sampling and Analysis Plan to collect and biologically analyze these sediments was submitted to the USACE on April 24, 2006 and was approved on July 12, 2006. Sediment was collected in August 2006 and underwent biological analyses. On February 9, 2007, results of the analyses were submitted to the USACE and EPA for review (see Attachment V to Weaver's Cove March 2, 2007 Response to Comments submittal to MADEP). The data show that the wooden pier sediment is suitable for offshore disposal at either the RISDS or the MBDS. The USACE/USEPA Suitability Determination review is ongoing and Weaver's Cove will keep MADEP updated as information becomes available.

In FERC's FEIS, a rigorous analysis of Weaver's Cove's sediment, elutriate, and river water data, including a statistical analyses of the levels of mercury is reported. In these early studies, the total mercury levels were compared to a number of screening criteria (see Sections 4.2.2 and 4.6.2 of the FEIS).

In subsequent testing, as part of the evaluation to support a Suitability Determination for offshore disposal of the dredged material, the USACE and the USEPA reviewed the concentrations of mercury in biological tissue samples as part of a number of bioaccumulation test programs using sediment and river water collected from the proposed dredging limits. A series of tests were conducted using a number of sensitive organisms that live in sediment or live in water over the sediment. This bioaccumulation test and tissue analysis program, required as part of the Tier III Evaluation, exposed a number of sensitive aquatic organisms to environmental conditions that would be encountered during disposal operations. Tissue testing showed acceptable levels of a suite of chemical constituents at concentrations deemed acceptable for offshore disposal under the criteria by the USEPA and the Corps. Mercury was one of the many compounds tested. These results are documented in the suitability determination issued jointly by the USEPA and USACE approving the offshore disposal of the material (see September 22, 2005 Interagency Memo executed by the USACE and the USEPA, SUBJECT: Review of Compliance with the Testing Requirements of 40 C.F.R 227.6 and 227.27 for the Weaver's Cove LNG Project, Mount Hope Bay and Taunton River, Fall River, Massachusetts, Application Number 2002-02231 for Disposal into Waters of Massachusetts Bay, or Rhode Island Sound). Elutriate test results show the metals in the sediment are tightly adhered to the sediment and only trace levels of the metals move from the sediment into the water when the sediment and water are mixed together. Comparison of the elutriate results to the sediment results further substantiates that the chemical constituents in the sediments remain highly adsorbed to the sediment particles, especially fines.

Also, see NMFS.06 in Weaver's Cove March 2, 2007 Response to Comments submittal to MADEP for additional information regarding mercury.

RIAG.07 See response to RIAG.05 (endangered species).

RIAG.08 The RIAG claims that "144 acres of 'relatively shallow habitat specifically identified as spawning beds for winter flounder'" will be permanently impacted. Not only is the RIAG's statement factually incorrect, but the citation to the statement from John Torgan is misleading, because it contains no quantitative reference to support this claim. Regardless, the fact is that the existing Federal Navigation Channel and Turning Basin in their present state are already too deep to serve as winter flounder spawning habitat. Accordingly, the National Marine Fisheries Service ("NMFS") has estimated that 11 acres of *potential* winter flounder habitat will be permanently impacted by the Turning Basin expansion area (the area in question is "potential" habitat in its current configuration, but it will be too deep to serve as spawning habitat once it is dredged to -41 ft MLLW). It is important to note that this NMFS assessment of "potential" habitat is based strictly on water depth, without consideration of actual bottom conditions and suitability of existing exposed sediment type for winter flounder spawning.

The Project has offered a substantive mitigation program in response to the dredging of 11 acres of this "potential" winter flounder spawning habitat (see Section 4.2 of the Water Quality Certification application and Weaver's Cove response to Comment FR06.24 in the March 2, 2007 Response to Comments submittal to MADEP). It is expected that this mitigation program will be finalized via discussions with the USACE interagency working group and that the plan will be a requirement of the USACE Section 10 permit.

RIAG.09 See response to RIAG.05 (rare species).

RIAG.10 Areas mapped as habitat for soft-shelled clam *(Mya arenaria)* and American oyster *(Crassostrea Virginica)* do not overlap the dredging limits and will not be impacted by the project. Of the roughly 160 acre dredge footprint in Massachusetts, approximately 84 acres has been mapped by the DMF as potential habitat for northern quahog *(Mercenaria mercenaria).* However, as explained in TRSC.07 (shellfish) and NMFS.08 (shellfish and model results) in Weaver's Cove March 2, 2007 Response to Comments submittal to MADEP, this area does not constitute a commercial shellfish resource and, within Massachusetts, these areas already have been designated by DMF as having chronically high levels of bacteria (i.e., biologically contaminated) because of past wastewater discharges. This shellfish habitat is therefore currently impacted. Potential short-term impacts (i.e., removal of individuals) may occur as a result of the physical act of dredging, however, the record shows that these areas will be re-colonized within a short period by opportunistic benthic organisms, again providing benefits for foraging. Permanent impacts are not expected because the post-dredge elevations will not preclude shellfish from re-establishing the disturbed areas upon completion of the dredging activities. Notwithstanding this minimal impact, Weaver's Cove has proposed a performance based shellfish based mitigation plan that includes re-seeding to aid in the re-establishment of the quahog population within the areas dredged. See TRSC.07 for additional detail.

RIAG.11 See FR06.21 in Weaver's Cove March 2, 2007 Response to Comments submittal to MADEP for information regarding the Wild and Scenic River Act. Weaver's Cove has continued to consult with the USACE and the Department of Interior regarding the affects of the dredging project on the Taunton River.

RIAG.12 See response to RIAG.08 (winter flounder). Also, the Project no longer proposes any impacts to salt marsh habitat or subtidal habitat from filling activities on the LNG terminal site (see Weaver's Cove separate Water Quality Certification application for terminal construction (#W051073)). On January 30, 2007, MADEP issued a Water Quality Certification to Weaver's Cove for the construction activities now proposed on the LNG terminal site, concluding that *"there is reasonable assurance that the project or activity will be conducted in a manner which will not violate applicable water quality standards at 314 CMR 4.00."*

RIAG.13 See TRWA.02 (dissolved oxygen) in Weaver's Cove March 2, 2007 Response to Comments submittal to MADEP. See attached response from Weaver's Cove to the separate memorandum from ACRE that was provided by RIAG on March 19, 2007 in response to further late-filed comments.

Attachment B – Weaver's Cove Response to Applied Coastal Research & Engineering Memorandum

#79001/WeaversCove/SupplementalInfo/ACRE

April 25, 2007

Mr. Ken Chin
Massachusetts Department of Environmental Protection
Wetlands and Waterways Program
1 Winter Street
Boston, MA 02108

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Subject: Weaver's Cove Energy - Water Quality Certification for Dredging Activities (BRP-WW-07 & BRP-WW-10), Transmittal #W05-0847; Response to February 12, 2007 Memo from Applied Coastal Research and Engineering, Inc. to Save The Bay; provided to DEP by Rhode Island Department of Attorney General.

Dear Mr. Chin:

By letter dated March 19, 2007, the Rhode Island Department of Attorney General ("RIAG") submitted to you a copy of a two page memorandum dated February 12, 2007, addressed to John Torgan of Save the Bay from John Ramsey of Applied Coastal Research and Engineering, Inc. ("ACRE"). The ACRE memorandum was based on a review of the Weaver's Cove June 15, 2006 Supplemental Final Environmental Impact Report ("SFEIR").

The March 19, 2007 RIAG letter references the Water Quality Certification for Dredging Activities (BRP-WW-07 & BRP-WW-10), Transmittal #W05-0847) filed by Weaver's Cove Energy, LLC. In that the public comment period on that application closed on January 3, 2007, the letter from the RIAG and the accompanying ACRE memorandum were not filed as public comment on the Weaver's Cove application.

However, in order to provide you with accurate information regarding these issues, Weaver's Cove is providing the following responses to the points raised in the ACRE memorandum. In the format below, each original ACRE comment is repeated, along with the response from Weaver's Cove. A complete copy of the RIAG letter and the ACRE memorandum are also attached for ease of reference.

ACRE Comment No. 1

As requested, Applied Coastal Research and Engineering, Inc. (Applied Coastal) has reviewed the Weaver's Cove Energy LNG Project Supplemental Final Environmental Impact Report (SFEIR) dated June 15, 2006. In general, our review comments are limited to the modeling information presented within the SFEIR, as well as the proposed sediment/water quality monitoring. Much of the detailed modeling information is contained in previous versions of the environmental permitting documents or in reports/papers not related to the proposed LNG project.

As noted throughout the SFEIR, there have been significant hydrodynamic and water quality modeling efforts performed for a wide-range of projects within the Mount Hope Bay estuarine system. According to the SFEIR, the hydrodynamic model that simulates tidal circulation within the estuary has undergone extensive testing and has been calibrated and validated for this region. Based on the numerous publications regarding the baseline hydrodynamic model, it appears those circulation patterns associated with present conditions are accurately simulated by WQMAP. The refined modeling associated with this project consisted of increased grid resolution in the vicinity of the proposed dredging. This refined hydrodynamic model was calibrated with current measurements located at the proposed terminal site.

Weaver's Cove Response to Comment No. 1

According to this comment, ACRE concurs that the hydrodynamic modeling performed was appropriate and acceptable. However, to the extent that ACRE limited its review to information presented in the June 15, 2006 SFEIR and did not review the numerous studies, literature reviews, and independent assessments provided in prior parts of the permitting record, ACRE's other comments lack foundation.

ACRE Comment No. 2

Results from the hydrodynamic model (WQMAP) were used to drive a sediment transport model (SSFATE), jointly developed by Applied Science Associates and the U.S. Army Corps of Engineers. The SFEIR included a paper presented at the 36th TAMU Dredging Seminar in 2004, where the SSFATE model was applied to sites in the Chesapeake Bay and Florida (Swanson, et al., 2004). While this paper provides site-specific calibration information regarding the use of SSFATE at two sites, the calibration coefficients utilized in these examples cannot simply be *applied to other sites. Specifically, the sediment release rate of 0.5% may not be appropriate for sites with different bottom sediment release rates (0.22% to 1.32%) were incorporated into the model to simulate the extent of impacts associated with the proposed dredging. As a numerical exercise, this type of sensitivity analysis provides valuable information for assessing a range of possible impacts. However, it would be appropriate to include even larger values of sediment release rates that would be more consistent with empirically derived release rates of the proposed dredging technique. In this manner, the upper bound of model-predicted suspended sediment concentrations could be considered to be conservative.*

Weaver's Cove Response to Comment No.2

SSFATE calibration coefficients were not simply applied from Chesapeake Bay and Florida applications. The Applied Science Associates ("ASA") modeling work began with the high end of observations by Hayes and Wu (2001)[1] in Boston which ranged from 0.10% to 0.22% for closed buckets. The 0.22% release rate for closed buckets was then increased by a factor if six and applied for the maximum dredge rate in each modeled segment.

ASA agrees with ACRE's comment that the sensitivity analysis used is appropriate (and why it was originally used). ASA disagrees that the range of release rates was insufficient – as already noted, the value of 1.32% is six times the maximum value observed in Boston (0.22%).

ACRE Comment No. 3

The selection of model parameters in SSFATE relates directly to both the proposed mixing zones and the appropriate turbidity monitoring for the project. The Massachusetts DEP has indicated that the 1,000 foot mixing zone is excessively large. Therefore, it would be appropriate to limit the mixing zone to a smaller area (perhaps 100 meters) to ensure that water quality impacts associated with the dredging do not become excessive. According to the SSFATE model results described in Section 4 of the SFEIR, the model is typically conservative and tends to over-predict TSS concentrations and under-predict particle settling. If this is the

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[1] Hayes, D. and P.-Y. Wu. 2001. Simple approach to TSS source strength estimates. Proceedings of the Western Dredging Association Twenty-first Technical Conference and Thirty-third Annual Texas A and M Dredging Seminar Special PIANC Session / Texas A and M University, Center for Dredging Studies, pg. 303, June, 2001.

case, the actual mixing zone during dredging should be significantly lower than the mixing zone predicted by the model. This smaller mixing zone should be utilized as the basis for Massachusetts DEP restrictions on turbidity relative to reference/background. Based on model predictions (Figure 4-1 of the SFEIR), TSS concentrations near the Turning Basin site are approximately 3-to-4 times higher for a 100 meter (330 feet) mixing zone than for the 1,000 foot mixing zone proposed.

Weaver's Cove Response to Comment No. 3

ACRE did not review the Draft Water Quality Monitoring Plan, included as Attachment K in the updated Water Quality Certification application, which proposed a 500-foot mixing zone for each of the five dredging elements. Other mixing zone dimensions proposed by Weaver's Cove are presently being discussed with DEP, along with a verification sampling plan for the SSFATE model.

ACRE Comment No. 4

In addition to suspended sediment concentration, the dissolved oxygen (DO) levels within the estuary are also a concern. During the summer months, system-wide hypoxia occurs within Mount Hope Bay. The limited proposed dredging along much of the navigation channel would have a negligible impact on DO levels within this region. However, the significant "bank-to-bank" deepening required for creation of the Turning Basin could exacerbate DO problems within the estuarine system. Since DO levels are related to water temperature, salinity, vertical mixing, and presence of organic matter, dredging of a relatively deep hole may cause further reductions in DO concentrations. Specifically, deepening of the channel and turning basin will directly influence salinity levels and possibly stratification characteristics of the estuarine system. From a long-term water quality perspective (related to both water column and benthic habitat), an analysis of dredging impacts on DO levels should be performed.

Weaver's Cove Response to Comment No. 4

ACRE agrees that Federal Channel dredging will have negligible impact on DO levels.

The dredging in the Turning Basin is not going to create a "relatively deep hole." In fact, the proposal is to dredge the Federal Channel to 37 feet and the Turning Basin to 41 feet, so the shallow difference in dimension will be 4 feet across a horizontal dimension of approximately 1,200 feet. Since this area is strongly tidally dominated, and because the depression is so shallow with such large plan dimensions (width and length), the tidal flow in the river will replace the water in the Turning Basin at each tide. The river presently flushes quickly in this area and an increase in cross sectional area will reduce the peak tidal current velocity only by 14%, from approximately 60 cm/s to 52 cm/s (118 feet per minute to 102 feet per minute). These velocities are consistent with other areas along the river where the river width and depth changes as one moves upstream and downstream.

To determine the potential for stratified conditions, ASA searched for historical data containing vertical profiles of salinity and dissolved oxygen in the lower Taunton River. One data set found was supplied by Gerry Szal of MADEP and was collected by Marine Research, Inc. as part of the monitoring for the Brayton Station in Somerset. The relevant data location was on the Borden Flats area just north of the Braga Bridge. The data were collected at surface, middle and bottom depths and in a water depth averaging of 18.2 feet. Data were collected each month from 1997 through 2003. The lower water column DO vertical gradient was calculated at -0.008 mg/L/ft. If this gradient can be assumed to extend to the channel bottom, the DO decrease, over a distance of 4 feet, is very small at 0.032 mg/L.

The second data set found was the so-called "Insomniacs" data (taken at night during the summers of 1999 through 2003 in Narragansett Bay and Mt. Hope Bay). This measurement program was designed to capture low DO levels typically found in pre-dawn hours during neap tides and low winds in the summer. A total of nine profiles were identified at a station described as "mid channel east of Green Can 15 off the USS Massachusetts just northeast of the Braga Bridge." Measurements were taken every 1 to 2 m in the vertical from near surface to near bottom (approximately 11.2 m). The average vertical salinity gradient found from the two adjacent near bottom measurements was 0.16 psu/m indicative of very small stratification. An increase of 4 ft in depth will increase the salinity by only 0.20 psu. The average vertical DO gradient was -0.05 mg/L/m, which is also very small. Using these data, an increase of 4 feet in depth would decrease DO by 0.07 mg/L. Thus, from actual data, there is little likelihood that the increased depth of the Turning Basin will cause increased stratification and lower DO. Thus, modeling the DO levels due to dredging impacts is not necessary.

Weaver's Cove addressed this issue in the March 2, 2007 submittal to MADEP responding to timely public comments (see response to TRWA.02).

ACRE Comment No. 5

As described above, the baseline hydrodynamic model can be expected to accurately simulate water circulation within the Mount Hope Bay/Taunton River estuarine system. However, secondary processes are more difficult to model accurately, since they often depend on multiple, often inter-related, variables. For the Mount Hope Bay/Taunton River system, suspension and transport of fine-grained materials is modeled by SSFATE. Although the model has been effectively calibrated for other regions (specifically, Chesapeake Bay and western Florida), a true calibration of the model for the Mount Hope Bay system would require a significant in situ data collection effort. Therefore, it may be most appropriate to utilize conservative assumptions for sediment release rates associated with the proposed dredging effort. Water column dissolved oxygen levels also may be a long-term concern as a result of the proposed deepening. Proposed alterations of the system bathymetry may allow higher salinity water to propagate further upstream, possibly enhancing stratification and exacerbating DO problems within the estuary. The existing three-dimensional hydrodynamic model should be utilized to assess long-term changes to circulation and stratification. Based on this modeling, the project proponent should indicate whether this alteration will have a long-term beneficial or adverse impact to water quality in the vicinity of the Turning Basin.

Weaver's Cove Response to Comment No. 5

Again, ACRE agrees that the hydrodynamic modeling approach used is accurate. In the Response to Comment No. 2 above, ASA explains why the loss rates are, in fact, conservative. ACRE suggests that true calibration requires in situ data collection. As noted above, Weaver's Cove is discussing with MADEP a field verification program to measure the actual extent of the suspended sediment plume in the water column.

Further, the overall area of the Turning Basin area is very small relative to the estuary and will have no effect on estuary-scale DO problems. The 14% reduction in current speed in the Turning Basin is well within normal variation based on spring-neap cycle. Based on an analysis of available data, there is no reason to expect near bottom stratification in the Turning Basin.

We hope you will find this response to be helpful.

Sincerely,
EPSILON ASSOCIATES, INC.

Michael D. Howard
Manager, Ecological Sciences

Theodore A. Barten, P.E.
Managing Principal

Encl.

CC: Phil Weinberg, DEP
Rich Lehan, Esq., DEP
Lealdon Langley, DEP
Ted Gehrig, Weaver's Cove Energy, LLC
Barry Fogel, Esq., Keegan Werlin LLP
Craig Swanson, PhD, Applied Science Associates

Applied Coastal Research and Engineering, Inc.
766 Falmouth Road
Suite A-1
Mashpee, MA 02649

MEMORANDUM

Date: February 12, 2007

To: John Torgan, Save the Bay

From: John Ramsey

Subject: Weaver's Cove Energy LNG Project, SFEIR Review

As requested, Applied Coastal Research and Engineering, Inc. (Applied Coastal) has reviewed the Weaver's Cove Energy LNG Project Supplemental Final Environmental Impact Report (SFEIR) dated June 15, 2006. In general, our review comments are limited to the modeling information presented within the SFEIR, as well as the proposed sediment/water quality monitoring. Much of the detailed modeling information is contained in previous versions of the environmental permitting documents or in reports/papers not related to the proposed LNG project.

As noted throughout the SFEIR, there have been significant hydrodynamic and water quality modeling efforts performed for a wide-range of projects within the Mount Hope Bay estuarine system. According to the SFEIR, the hydrodynamic model that simulates tidal circulation within the estuary has undergone extensive testing and has been calibrated and validated for this region. Based on the numerous publications regarding the baseline hydrodynamic model, it appears that circulation patterns associated with present conditions are accurately simulated by WQMAP. The refined modeling associated with this project consisted of increased grid resolution in the vicinity of the proposed dredging. This refined hydrodynamic model was calibrated with current measurements located at the proposed terminal site.

Results from the hydrodynamic model (WQMAP) were used to drive a sediment transport model (SSFATE), jointly developed by Applied Science Associates and the U.S. Army Corps of Engineers. The SFEIR included a paper presented at the 36th TAMU Dredging Seminar in 2004, where the SSFATE model was applied to sites in the Chesapeake Bay and Florida (Swanson, et al., 2004). While this paper provides site-specific calibration information regarding the use of SSFATE at two sites, the calibration coefficients utilized in these examples cannot simply be applied to other sites. Specifically, the sediment release rate of 0.5% may not be appropriate for sites with different bottom sediment characteristics and/or hydrodynamic conditions. The SFEIR indicated that a range of sediment release rates (0.22% to 1.32%) were incorporated into the model to simulate the extent of impacts associated with the proposed dredging. As a numerical exercise, this type of sensitivity analysis provides valuable information for assessing a range of possible impacts. However, it would be appropriate to include even larger values of sediment release rates that would be more consistent with empirically derived release rates of the proposed dredging technique. In this manner, the upper bound of model-predicted suspended sediment concentrations could be considered to be conservative.

The selection of model parameters in SSFATE relates directly to both the proposed mixing zones and the appropriate turbidity monitoring for the project. The Massachusetts DEP has indicated that the 1,000 foot mixing zone is excessively large. Therefore, it would be appropriate to limit the mixing zone to a smaller area (perhaps 100 meters) to ensure that water quality impacts associated with the dredging do not become excessive. According to the SSFATE model results described in Section 4 of the SFEIR, the model is typically conservative and tends to over-predict TSS concentrations and under-predict particle settling. If this is the case, the actual mixing zone during dredging should be significantly lower than the mixing zone predicted by the model. This smaller mixing zone should be utilized as the basis for Massachusetts DEP restrictions on turbidity relative to reference/background. Based on model predictions (Figure 4-1 of the SFEIR), TSS concentrations near the Turning Basin site are approximately 3-to-4 times higher for a 100 meter (330 feet) mixing zone than for the 1,000 foot mixing zone proposed.

In addition to suspended sediment concentration, the dissolved oxygen (DO) levels within the estuary are also a concern. During the summer months, system-wide hypoxia occurs within Mount Hope Bay. The limited proposed dredging along much of the navigation channel would have a negligible impact on DO levels within this region. However, the significant "bank-to-bank" deepening required for creation of the Turning Basin could exacerbate DO problems within the estuarine system. Since DO levels are related to water temperature, salinity, vertical mixing, and presence of organic matter, dredging of a relatively deep hole may cause further reductions in DO concentrations. Specifically, deepening of the channel and turning basin will directly influence salinity levels and possibly stratification characteristics of the estuarine system. From a long-term water quality perspective (related to both water column and benthic habitat), an analysis of dredging impacts on DO levels should be performed.

As described above, the baseline hydrodynamic model can be expected to accurately simulate water circulation within the Mount Hope Bay/Taunton River estuarine system. However, secondary processes are more difficult to model accurately, since they often depend on multiple, often inter-related, variables. For the Mount Hope Bay/Taunton River system, suspension and transport of fine-grained materials is modeled by SSFATE. Although the model has been effectively calibrated for other regions (specifically, Chesapeake Bay and western Florida), a true calibration of the model for the Mount Hope Bay system would require a significant *in situ* data collection effort. Therefore, it may be most appropriate to utilize conservative assumptions for sediment release rates associated with the proposed dredging effort. Water column dissolved oxygen levels also may be a long-term concern as a result of the proposed deepening. Proposed alterations of the system bathymetry may allow higher salinity water to propagate further upstream, possibly enhancing stratification and exacerbating DO problems within the estuary. The existing three-dimensional hydrodynamic model should be utilized to assess long-term changes to circulation and stratification. Based on this modeling, the project proponent should indicate whether this alteration will have a long-term beneficial or adverse impact to water quality in the vicinity of the Turning Basin.

Howard, Mike

From: Howard, Mike
Sent: Thursday, May 10, 2007 4:29 PM
To: 'Szal, Gerald (DEP)'; 'Chin, Ken (DEP)'
Cc: Lehan, Richard (DEP); Langley, Lealdon (DEP); Barry Fogel
Subject: Tier II and Tier III Data Table

Attachments: TierII_TierIII_Elutriates_Comparison_FINAL 5-9-07.pdf

Gerry & Ken,

As was requested at our meeting on April 28th, attached please find a spreadsheet showing the Weaver's Cove Tier II and Tier III data for (1) sediment chemistry (copper and zinc), and (2) elutriate results (copper and zinc). This table illustrates the point we made at the meeting that there is generally good agreement between the Tier II and Tier III sediment chemistry results.

We are still pulling the laboratory QA/QC information that you requested and will send that to you soon.

Thanks,
Mike

TierII_TierIII_Elutriat
es_Comp...

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Federal Channel / S-Bend

Tier II[1] March 2003

	EPA 2006 WQC (acute and chronic)		Federal Channel: Lower Federal Channel	Federal Channel: Upper Federal Channel MA-3						Federal Channel: Upper Fed Channel MA-7				S-Bend: S-Bend MA-12				S-Bend: East Channel Composite
	Water Quality Criteria			(0-6)		(6-8)		(0-8)		(0-4)		(0-4)		(0-9)		(0-9)		
	AL CMC	AL CCC		Sediment		Sediment		Elutriate		Sediment		Elutriate		Sediment		Elutriate		
Metals	ug/L	ug/L		ppm	Q	ppm	Q	µg/L	Q	ppm	Q	µg/L	Q	ppm	Q	µg/L	Q	
Copper	4.8	3.1	*No Tier II Elutriate Samples*	83	E	13	E	21		81		26		120		21		*No Tier II Elutriate Samples - See Note 12.*
Zinc	90	81		190		73		45		190		65		250		77		

Tier III[2] Fall 2004

	EPA 2006 WQC (acute and chronic)		Federal Channel: Lower Federal Channel Composite[3]				Federal Channel: Upper Federal Channel Composite (includes MA-3 and MA-7)[4]				S-Bend: S-Bend Composite (includes MA-12)[5]				S-Bend: East Channel Composite[6]			
	Water Quality Criteria																	
	AL CMC	AL CCC	Sediment		Elutriate		Sediment		Elutriate		Sediment		Elutriate		Sediment		Elutriate	
Metals	ug/L	ug/L	ppm	Q	µg/L	Q	ppm	Q	µg/L	Q	ppm	Q	µg/L	Q	ppm	Q	µg/L	Q
Copper	4.8	3.1	36		0.63		82		1.03		120		0.68		94		1.9	
Zinc	90	81	110		5	U	200		5	U	260		5	U	310		8.43	

Turning Basin

Tier II[1]
March 2003

	EPA 2006 WQC (acute and chronic)		Southern Turning Basin TB-3								Northern Turning Basin TB-11						Wooden Pier TB-10				Access Channel
	Water Quality Criteria		(0-6)		(0-6)		(6-10)		(6-10)		(0-8)		(8-17)		(11-17)		(0-9)		(0-9)		*No Tier II Elutriate Samples*
	AL CMC	AL CCC	Sediment		Elutriate		Sediment		Elutriate		Sediment		Sediment		Elutriate		Sediment		Elutriate		
Metals	ug/L	ug/L	ppm	Q	µg/L	Q	ppm	Q	µg/L	Q	ppm	Q	ppm	Q	µg/L	Q	ppm	Q	µg/L	Q	
Copper	4.8	3.1	120		42		17		17		69		4.5		16		150		56		
Zinc	90	81	240		200		71		57		180		17		64		330		380		

Tier III[2]
Fall 2004: Turning Basin and Access Channel; Aug 2006: Wooden Pier

	EPA 2006 WQC (acute and chronic)		Southern Turning Basin Composite (includes TB-3)[7]				Northern Turning Basin Composite (includes TB-11)[8]				Wooden Pier TB-10 Composite[9]			Access Channel Composite[10]			
	Water Quality Criteria																
	AL CMC	AL CCC	Sediment		Elutriate		Sediment		Elutriate			Elutriate		Sediment		Elutriate	
Metals	ug/L	ug/L	ppm	Q	µg/L	Q	ppm	Q	µg/L	Q	*See Note 11*	µg/L	Q	ppm	Q	µg/L	Q
Copper	4.8	3.1	110		1.09		120		0.88			0.96		26		0.65	
Zinc	90	81	210		5.53		260		6.93			4.6		91		5	U

NOTES

U = undetected at level reported.

E = estimated due to interference

(Numbers in parentheses represent depth)

1. Tier II Samples represent individual locations.
2. Tier III Samples are composites of several individual locations.
3. Lower Federal Channel Composite is a composite of 5 samples: 3RI-2, 3RI-3, 3RI-4, 3RI-6, 3RI-7.
4. Upper Federal Channel Composite is a composite of 11 samples: 3MA-2, 3MA-3, 3MA-4, 3MA-5, 3MA-7, 3MA-8, 3MA-9, 3MA-20, 3MA-A, 3MA-B, 3MA-D.
5. S-Bend Composite is a composite of 6 samples: 3MA-11, 3MA-12, 3MA-14, 3MA-16, 3MA-18, 3MA-F.
6. East Channel composite is a composite of 2 samples: EC-4 and EC-5.
7. Southern Turning Basin Composite is a composite of 2 samples: 3TB-3 and 3TB-4.
8. Northern Turning Basin is a composite of 4 samples: 3TB-7, 3TB-8, 3TB-11, and 3TB-14.
9. Wooden Pier TB-10 Composite is a composite of 6 samples located near the Wooden Pier/Terminal.
10. Access Channel Composite is a composite of 5 samples: AC-1, AC-2, AC-3, AC-4, AC-5.
11. Chemical analysis of bulk sediment was performed on Sample TB-10 in association with the Tier II evaluation. Additional chemical analysis was not required in USACE-issued Tier III Wooden Pier Sampling and Analysis Program and was therefore not conducted by Weaver's Cove as part of the biological analyses for offshore disposal suitability evaluation.
12. MCZM sampled the East Channel sediment in 1997 and created 2 composite samples, EC-A and EC-B. Respective copper values were 83 and 55 ppm; respective zinc values were 270 and 180 ppm.

Howard, Mike

From: Barry Fogel [bfogel@keeganwerlin.com]
Sent: Thursday, May 31, 2007 12:31 PM
To: Howard, Mike; Barten, Ted; Gehrig, Ted
Cc: Craig Swanson
Subject: FW: WCE
Attachments: ASA Dilution Analysis (5-31-07).pdf

FYI

-----Original Message-----
From: Barry Fogel
Sent: Thursday, May 31, 2007 12:25 PM
To: 'Lehan, Richard (DEP)'
Cc: Weinberg, Philip (DEP)
Subject: WCE

Hi Rich - Attached is the Dilution Analysis prepared by ASA to address the elutriate study issues that we discussed some time back. I will rely on you to circulate it as necessary internally.

Also, could you please give me an update on the status of scheduling of further meetins on the pending permit reviews? Thanks - Barry

<<ASA Dilution Analysis (5-31-07).pdf>>

Barry P. Fogel
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Weavers Cove Energy, Dredging Water Quality Certification Elutriate Dilution Analysis

By: Craig Swanson, ASA

Date: May 31, 2007

Overview

During discussions with the Department of Environmental Protection (DEP) about the application for Water Quality Certification for the Weaver's Cove Energy (WCE) dredging activities, WCE has pointed out that the results of the 2004 and 2006 Tier III elutriate analyses indicate that trace levels of dissolved metals released into the water column during dredging will *not* result in exceedances of water quality standards. DEP has asked whether WCE can provide further support for this conclusion in light of the different results obtained during the Tier II elutriate analyses conducted in 2003. To address this question, ASA has conducted an analysis that compares the actual dilution effect that will occur within the river system during dredging operations with the extremely conservative dilution effect that was obtained from the laboratory-based elutriate sample preparation procedure.

Elutriate Test Results

WCE's first elutriate analyses were completed in 2003 during the Tier II sediment studies. In an elutriate test, water is mixed with sediment and the chemical properties of the water phase are then studied.[1] While most chemical constituents in the Tier II elutriate samples were below the EPA acute and chronic Aquatic Life water quality criteria, copper and zinc concentrations exceeded the EPA criteria.[2] Tier II elutriate test results for copper and zinc are summarized in Table 1 below.

Table 1. Summary of 2003 Tier II elutriate analyses for surface sediments in the Turning Basin

Metal	EPA Water Quality Criteria	EPA Water Quality Criteria	Southern Turning Basin	Southern Turning Basin	Northern Turning Basin	Wooden Pier
	Acute	Chronic	TB-3 (0-6)	TB-3 (6-10)	TB-11 (11-17)	TB-10 (0-9)
	(µg/L)	(µg/L)	(µg/L)	T(µg/L)	(µg/L)	(µg/L)
Copper	4.8	3.1	42	17	16	56
Zinc	90	81	200	57	64	380

[1] Elutriate samples were prepared by mixing sediment and water in a 1:4 ratio, mixing vigorously for 30 minutes, allowing the mixture to settle, and then siphoning off the supernatant for analysis.

[2] Zinc water quality criteria were exceeded in samples TB-10 (0-9) and TB-3 (0-6); copper water quality criteria were exceeded in each of the 7 elutriate samples.

The highest Tier II elutriate concentrations measured for both copper and zinc occurred when evaluating sediments collected near the Wooden Pier (sample location TB-10). The existing Wooden Pier is located adjacent to the proposed LNG terminal site on the federal Turning Basin.

In 2004, the Project conducted an extensive Tier III sediment study in support of its proposal for ocean disposal of suitable sediments. Further elutriate testing was conducted during the 2004 Tier III evaluation. Elutriate testing was conducted using sediments collected in the Turning Basin with the exception of the area immediately around sample location TB-10. Sediments from the location TB-10 were subsequently sampled and tested during the further Tier III studies conducted in 2006.

In contrast to the initial 2003 Tier II elutriate results, the 2004 and 2006 Tier III elutriate results were below the acute and chronic Aquatic Life criteria for **all** constituents measured (including copper and zinc). More specifically, the 2006 TB-10 Tier III elutriate results for zinc were a factor of 10 lower than acute and chronic Aquatic Life criteria, while the 2006 TB-10 Tier III elutriate results for copper were a factor of three lower than the acute and chronic Aquatic Life criteria.

Notwithstanding the clear indication from the 2004 and 2006 Tier III elutriate results that trace levels of dissolved metals released into the water column during dredging will *not* result in exceedances of water quality standards, DEP has requested additional analysis that would support this conclusion in light of the earlier Tier II (2003) analyses.

To address this question, ASA has evaluated how the dilution effect within the river system that will occur during dredging operations compares to the conservative dilution (4 to 1 ratio of water to sediment) used during the laboratory based elutriate test procedure. As noted above, the highest elutriate concentrations for both copper and zinc occurred when testing Wooden Pier (TB-10) samples collected from a location immediately adjacent to the Turning Basin. The analysis presented below is based on these 2003 Tier II TB-10 sediment testing results. Accordingly, this analysis represents the most conservative (worst case) calculation of potential effects.

<u>Calculation of Dilution of Dissolved Phased Copper and Zinc During Dredging</u>

Absent any consideration of in river dilution, elutriate results provide an **extremely** conservative assessment of potential dissolved phase metals during dredging. Elutriate preparation involves significant agitation of sediment and river water, much more mixing than will occur during the mechanical dredging technique proposed by Weaver's Cove (especially when considering Weaver's Cove's commitment to use a closed bucket and to allow no deliberate scow overflow). The elutriate preparation for Tier II (2003) and Tier III (2004 and 2006) analyses included mechanically and physically mixing one part sediment to four parts water for the intended purpose of encouraging greater dissolution of chemical constituents in the sediments into the water column. The effect is similar to hydraulically dredging with subsequent pumping of the dredged material slurry through a pipe to a remote disposal location. Mechanical dredging, as proposed by Weaver's Cove, will result in significantly less water/sediment interface. Therefore, the elutriate preparation and subsequent analytical results reported in the Tier II and Tier III testing programs both significantly over-predicted chemical concentrations dissolved in the water column.

The following calculations provide an estimate of the effects of dilution on copper and zinc (or other chemical constituents) that may be released during dredging activities. The approach for calculating the likely dilution that would occur during actual dredging uses the simple 1-dimensional advection-diffusion equation that simulates the release of a constituent in a flowing body of water. The results indicate concentration as a function of distance from the dredge. The highest concentration is located at the dredging source location. Accordingly, this analysis will focus on the near dredge area. The constituent source strength is based on measured elutriate concentrations described below.

The 1-dimensional advection-diffusion equation is given as:

$$\frac{\partial C}{\partial t} = C\frac{\partial U}{\partial x} + D\frac{\partial^2 C}{\partial x^2}$$

where

C is constituent concentration (µg/L, microgram per liter)
U is current speed (m/s, meters/second)
D is longitudinal diffusivity (m^2/s)
t is time (s, seconds)
x is downstream distance (m, meters)

The solution of this equation is given in Ward and Espey (1971) in terms of the error function

$$C = \frac{W}{2AU}\exp(\frac{xU}{2D})\left\{ \left[erf(\frac{x+Ut}{\sqrt{4Dt}}) \pm 1\right]\exp(+\frac{xU}{2D}) - \left[erf(\frac{x-Ut}{\sqrt{4Dt}}) \pm 1\right]\exp(-\frac{xU}{2D}) \right\}$$

where

W is source mass rate (µg/s)
A is cross sectional area (m^2)

The total source mass rate is taken from the SSFATE[3] input for dredging of surface sediments in the Turning Basin. This location has the highest production rate (10,000 yds^3/day) of the four dredging reaches.[4] The cross sectional area is defined as the water depth times the plume width. The water depth is nominally 33 ft (10 m) and the minimum width of the resulting plume is 3 m, approximately the width of the 26 yd^3 bucket used for dredging these sediments. In this analysis, the "plume" width is associated with the physical point of dredging, as compared to the larger areas of dredging-induced "plumes" described in the MEPA filings. Thus, the production rate is a conservatively high estimate and the plume width is a conservatively low estimate, resulting in the *most conservative* concentration estimate.

The source mass rate and cross sectional area are related to the portion of the water column where sediment is released. Table 2 summarizes these areas and rates taken

[3] The SSFATE model has been extensively discussed in the permitting record for Weaver's Cove and that discussion is not repeated here.

[4] Concentration scales linearly with dredge production rate (lower dredging rates lower concentrations)

from the SSFATE model inputs for each layer of the water column. The total release rate of sediment into the water column is 1.32% of the dredging rate[5] or 0.001168 m^3/s.

Table 2. Summary of inputs from SSFATE model used in this analysis.

Layer	% of 10 m Water Depth	Layer Thickness	% of Total Release Rate	Layer Release Rate
		(m)		(m^3/s)
Surface	20	2	20	0.000234
Mid	60	6	30	0.000350
Bottom	20	2	50	0.000584

The metals release rates are determined from the sediment loss rate and the elutriate concentration. Since the elutriate concentration for dissolved metals is based on a volume mixture of 1 L of sediments to 4 L of water, the metals release rate, or model source strength, is found by multiplying four times the elutriate concentration, converting units, and multiplying by the sediment release rate. The results are shown in Table 3.

Table 3. Copper and zinc source strengths for Wooden Pier TB-10 (0-9) sample

Layer	Sediment Release Rate	Copper Source Strength	Zinc Source Strength
	(m^3/s)	(µg/s)	(µg/s)
Surface	0.000234	52.3	355.1
Mid	0.000350	78.5	532.7
Bottom	0.000584	130.8	887.8

Using the copper and zinc source strengths and the appropriate cross section areas in the equation for concentration, the following results (Table 4) were obtained for the three layers. The sensitivity to ambient river currents (from 10 cm/s[6] to 60 cm/s taken from previous field observations and modeling (Swanson et al., 2003) is also shown, as are the EPA Acute and Chronic Water Quality Criteria for comparison.

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[5] Here again, this analysis uses a very conservative (high) estimate of sediment release rate. ASA believes this release rate is roughly six times greater than predicted values. The conservative nature of this release rate has been extensively discussed during the permitting review of the Weaver's Cove project and is not repeated here.

[6] 10 cm/s is approximately 19.7 ft/min or 0.22 miles/hr; 60 cm/s is approximately 118 ft/min or 1.34 miles/hr.

Table 4. Peak concentrations of copper and zinc for modeled layers <u>at the dredge site</u> and at a range of ambient river current conditions.

Layer	Ambient Current	Peak Copper Concentration	Peak Zinc Concentration
	(cm/s)	(µg/L)	(µg/L)
Surface	10	0.080	0.54
	20	0.044	0.30
	30	0.029	0.20
	40	0.022	0.15
	50	0.017	0.12
	60	0.015	0.10
Mid	10	0.040	0.27
	20	0.022	0.15
	30	0.015	0.10
	40	0.011	0.07
	50	0.007	0.06
	60	0.007	0.05
Bottom	10	0.200	1.36
	20	0.109	0.74
	30	0.073	0.49
	40	0.055	0.37
	50	0.044	0.30
	60	0.036	0.25
EPA Acute (WQC)		4.8	90
EPA Chronic WQC		3.1	81

Based upon these calculations, it can be clearly seen that the peak concentrations from the release of dissolved phase copper and zinc during actual dredging will be significantly below the EPA chronic and acute water quality criteria within the immediate area of the dredge, and beyond, when the real world effects of dredging technique and ambient dilution are considered. Thus, the impacts from trace levels of metals release into the water column during dredging operations are shown to be insignificant and much lower than the levels measured during the very conservative elutriate testing program.

References

Swanson, C., D. French McCay, S. Subbayya, J. Rowe, P. Hall, T. Isaji, 2003. Modeling dredging-induced suspended sediment and the environmental effects in Mt. Hope Bay and the Taunton River for the proposed Weaver's Cove Energy, LLC, liquefied natural gas import terminal, Prepared for Weaver's Cove Energy, LLC, Fall River, Massachusetts, ASA Project 02-200, 91 p. plus appendices.

Ward, G. and W. Espey (eds.), 1971. Estuarine modeling: an assessment. Report 16070-DZV02/71. Environmental Protection Agency, U.S. Government Printing Office.

Howard, Mike

From: Barry Fogel [bfogel@keeganwerlin.com]
Sent: Thursday, June 07, 2007 2:13 PM
To: Lehan, Richard (DEP); Weinberg, Philip (DEP)
Cc: Howard, Mike; TGehrig@hesslng.com; Hartnett, Maria
Subject: WQC for dredging for WCE
Attachments: Weaver's Cove Tier II Qualified Metals Information.pdf

Rich - At our meeting on April 28, 2007, for the Weaver's Cove WQC application for dredging, DEP asked for a detailed description of all qualified metals sediment data from the Weaver's Cove Tier II evaluation. Attached is a report from Epsilon Associates addressing that request.

Also, a question was raised at the meeting regarding detection limits and the potential for sample dilution (up to 5 times) leading to elevated detection levels. Alpha Woods Hole Laboratory informed Epsilon that their reported "Reporting Limits" are based on the full (5 times) dilution. Thus, the reporting limits presented in the spreadsheets previously distributed are correct for all samples. For the elutriate samples, all reporting limits are below the water quality criteria.

Thanks - Barry

<<Weaver's Cove Tier II Qualified Metals Information.pdf>>

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Summary of Lab QA/QC for Qualified Metals Data
Weaver's Cove Tier II Sediment Chemistry Results (March 2003)
Prepared for MA DEP Based on Questions at the April 28, 2007 WQC Meeting

1.0 Preamble

The Massachusetts Department of Environmental Protection (MA DEP) requested additional information regarding the qualification of metals analytical data for sediment samples collected by Weaver's Cove Energy ("Weaver's Cove") during its Tier II Evaluation performed in 2003. Specifically, MADEP requested detailed results of the Quality Control ("QC") analyses and an assessment of the potential for a "low bias" in the metals data. This document has been prepared by Weaver's Cove to respond to this MA DEP inquiry.

During the 2003 Tier II evaluation, Weaver's Cove performed a vigorous sediment characterization by individually analyzing 55 discrete sediment stratum samples collected at 43 core locations within the proposed dredging limits. Section 5 of Weaver's Cove's Dredging Program, dated December 2003, provides a summary of the field efforts and the physical and chemical results of this comprehensive sediment characterization. This sediment characterization was performed in strict accordance with a U.S. Army Corps of Engineers ("USACE")-issued Sampling and Analysis Plan specific to this effort.

Subsequent to the Tier II Evaluation, Weaver's Cove performed a Tier III Evaluation in 2004 in accordance with a second USACE-issued Sampling and Analysis Plan. In the Tier III Evaluation, sediment was collected from multiple core locations and then composited to generate 7 composite samples, each representative of a geographic area within the dredging footprint (i.e, Northern Turning Basin, Southern Turning Basin, Access Channel, S-Bend, East Channel, Upper Federal Channel, Lower Federal Channel). Each of the 7 composite samples was chemically analyzed. Both the Tier II and Tier III Evaluations were conducted in accordance with federal and regional guidance manuals, including the USACE/Environmental Protection Agency ("EPA") Regional Implementation Manual for Evaluating Dredged Material for Disposal in New England ("RIM").

As detailed below, comparing the analytical results from the Tier II and Tier III Evaluations[1] demonstrates that qualified metals values are similar to non-qualified Tier II and Tier III data, with no indication of a low bias. This comparison demonstrates the consistency of the sediment characterization, and, in turn, the quality and reliability of the analytical results. To echo these findings, in their jointly-issued Suitability Determination, the USACE and EPA stated that the sediments have been adequately and thoroughly characterized.

[1] The Tier II and Tier III Evaluations sampled virtually the same sediment, though as individual samples from each stratum in Tier II versus composited samples from each stratum in Tier III.

2.0 Discussion of Qualified Data

The Tier II metals sediment data for the Weaver's Cove evaluation contain three types of qualifications. These qualifications are detailed below.

E - Estimated due to Interference:

The "E" qualifier pertains to results of the serial dilution analysis, which is a measure of potential bias. As part of the laboratory's QC procedures, a serial dilution analysis is performed once with each "batch" of samples or every 20 samples, whichever is less. The results of the serial dilution analysis are then applied to all the samples in the batch. To perform the serial dilution analysis, the selected sample is first run "straight" (e.g., undiluted) and then with a 1:5 dilution. The sample result and serial dilution result are then compared on a parameter by parameter basis by calculating a Relative Percent Difference ("RPD") between the two values. Parameters with a RPD above the QC acceptance limits of 10% result in qualification of all samples in the batch as estimated data ("E"). If the RPD is greater than 10% and the serial dilution result is greater than the sample result, the sample result has a potential low bias. If the RPD is greater than 10% and the serial dilution result is less than the sample result, the sample result has a potential high bias.

For the Weaver's Cove Tier II evaluation, comparison of the sample result and the serial dilution result[2] was greater than the 10% method acceptance limit for the following metals:

Cadmium:

- The difference between the sample result and serial dilution result was **12%** and greater than the 10% method acceptance limit. Sample result: **0.23 ppm**; serial dilution result: **0.20 ppm**. The following samples were qualified for a potential high bias: Turning Basin [TB-2(0-6),TB-3(0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

- The difference between the sample result and serial dilution result was **20%** and greater than the 10% method acceptance limit. Sample result: **0.16 ppm**; serial dilution result: **0.19 ppm.** The following samples were qualified for a potential low bias: Turning Basin [TB-1(0-9),TB-6 (13-15),TB-11(0-8),TB-11(8-17),MA-19(4-13)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

[2] Serial dilution analyses were conducted on samples: RI-7(0-6) [for batch with 11% lead difference]; MA CAD-2(0-10) [for batch with 20% cadmium difference]; TB-9(0-4) [for batch with 12% cadmium difference; 12% chromium difference; 17% mercury difference]; MA-3(6-8) [for batch with 15% copper difference; 16% lead difference; 12% nickel difference].

Chromium:

- The difference between the sample result and serial dilution result was 12% and greater than the 10% method acceptance limit. Sample result: 38 ppm; serial dilution result: 43 ppm. The following samples were qualified for a potential low bias: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Copper:

- The difference between the sample result and serial dilution result was 15% and greater than the 10% method acceptance limit. Sample result: 13 ppm; serial dilution result: 15 ppm. The following samples were qualified for a potential low bias: Turning Basin [none]; S-Bend [MA-10(0-3),MA-11(0-9),MA-13(0-9)], MA Federal Channel [MA-1(0-8),MA-2(0-5),MA-3(0-6),MA-3(6-8),MA-4(0-8),MA-5(0-5),MA-6(0-3),MA-8(0-5),MA-20(0-8)]; Rhode Island [RI-8(0-6)].

Lead:

- The difference between the sample result and serial dilution result was 11% and greater than the 10% method acceptance limit. Sample result: 68 ppm; serial dilution result: 75 ppm. The following samples were qualified for a potential low bias: Turning Basin [TB-8(0-8),TB-8(8-9)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [RI-1(0-6),RI-2(0-4),RI-3(0-5),RI-4(0-5),RI-5(0-5),RI-6(0-6), RI-7(0-6)].

- The difference between the sample result and serial dilution result was 16% and greater than the 10% method acceptance limit. Sample result: 14 ppm; serial dilution result: 16 ppm. The following samples were qualified for a potential low bias: Turning Basin [none]; S-Bend [MA-10 (0-3),MA-11(0-9),MA-13(0-9)]; MA Federal Channel [MA-1(0-8),MA-2(0-5),MA-3(0-6),MA-3(6-8),MA-4(0-8),MA-5(0-5),MA-6(0-3),MA-8(0-5),MA-20(0-8)]; Rhode Island [RI-8(0-6)].

Mercury:

- The difference between the sample result and serial dilution result was 17% and greater than the 10% method acceptance limit. Sample result: 0.19 ppm; serial dilution result: 0.22 ppm. The following samples were qualified for a potential low bias: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Nickel:

- The difference between the sample result and serial dilution result was 12% and greater than the 10% method acceptance limit. Sample result: 19 ppm; serial dilution result: **22 ppm.** The following samples were qualified for a potential low bias: Turning Basin [none]; S-Bend [MA-10 (0-3),MA-11(0-9),MA-13(0-9)]; MA Federal Channel [MA-1(0-8),MA-2(0-5),MA-3(0-6),MA-3(6-8),MA-4(0-8),MA-5(0-5),MA-6(0-3),MA-8(0-5),MA-20(0-8)]; Rhode Island [RI-8(0-6)].

Implications: For all qualified parameters, the differences between the sample and serial dilution results are not significant, indicating no significant bias to the data. Further, the parameters with the greatest percent difference between the sample result and serial dilution result – lead, mercury, and cadmium – had concentrations consistent with the unqualified data in the Tier II Evaluation and within the concentration range of the composited sample results of the Tier III Evaluation (as further discussed in the Comparison section below).

N – Spike Recovery outside Control Limits:

The "N" qualifier pertains to the spike analysis, which is a measure of potential bias. For this analysis, known concentrations of target analytes are added to a sample (the "spike"), which is then analyzed. The intention for the spike analyses is a means to assess the accuracy of the lab equipment by testing for known concentrations. As part of the laboratory's QA/QC procedures, a spike analysis was run with each "batch" of samples or every 20 samples, whichever is less. Therefore, biases due to spike analyses result in qualified data for all of the samples in the associated batch on a parameter by parameter basis. The QC limits for spike recovery are 75-125%. Samples associated with the spike recovered outside the QC limits are qualified data ("N"). Higher recovery than the QC limits indicates a potential high bias, lower recovery than the QC limits indicates a potential low bias.

For the Weaver's Cove Tier II Evaluation, the spike was recovered outside the QC limits for three metals[3]:

Lead:

- Recovery of lead from the spike sample was **74%** and outside of the 75% - 125% method acceptance range. The following samples were qualified: Turning Basin [TB-8(0-8),TB-8(8-9)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [RI-1(0-6),RI-2(0-4),RI-3(0-5),RI-4(0-5),RI-5(0-5),RI-6(0-6),RI-7(0-6)].

- Recovery of lead from the spike sample was **57%** and outside of the 75% - 125% method acceptance range. The following samples were qualified: Turning Basin [TB-4(0-6),TB-4(6-10),TB-7(0-10),TB-7(10-14),TB-12(0-3),TB-12(3-12),TB-13(0-2),TB-

[3] Spike analyses were conducted on samples: RI-7(0-6) [for batch with 74% recovery of lead and zinc]; TB-12(0-3) [for batch with 57% lead recovery]; MA-3(0-6) [for batch with 67% mercury recovery].

13(2-11),TB-14(0-12)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Mercury:

- Recovery of mercury from the spike sample was **67%** and outside of the 75% - 125% method acceptance range. The following samples were qualified: Turning Basin [none]; S-Bend [MA-10 (0-3),MA-11(0-9),MA-13(0-9)]; MA Federal Channel [MA-1(0-8),MA-2(0-5),MA-3(0-6),MA-3(6-8),MA-4(0-8),MA-5(0-5),MA-6(0-3),MA-8(0-5),MA-20(0-8)]; Rhode Island [RI-8(0-6)].

Zinc:

- Recovery of zinc from the spike sample was **74%** and outside of the 75% - 125% method acceptance range. The following samples were qualified: Turning Basin [TB-8(0-8),TB-8(8-9)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [RI-1(0-6), RI-2(0-4), RI-3(0-5),RI-4(0-5),RI-5(0-5),RI-6(0-6),RI-7(0-6)].

Implications: The spike analyses associated with listed Zinc and Lead samples with 74% recovery do not have significant bias, as the recovery of 74% is insignificantly different than the acceptance range of 75%. The Lead samples associated with a 57% recovery indicate a potential low bias confined to approximately one-third of the samples in the Turning Basin. The Mercury samples in the S-Bend and Federal Channel associated with a 67% recovery indicate a potential low bias. However, the qualified data for Lead and Mercury had concentrations consistent with the unqualified data in the Tier II Evaluation and within the concentration range of the composited sample results of the Tier III Evaluation. It is clear that the Tier II qualified results are consistent with the unqualified data and are therefore representative of the parameter concentration (see the Comparison section below).

¤ - Duplicate outside control limits:

The ¤ qualifier pertains to the duplicate analysis, which measures precision, or repeatability, of laboratory measurements. A sample is homogenized, two aliquots are prepared and analyzed, and the results are compared.[4] The inherent variability of environmental samples can affect these results. The associated QC standard is a relative percent difference (RPD) between the sample and duplicate of 20% or less. The result of a single duplicate analysis is applied to the entire sample batch (approximately 20 samples). Parameters with a RPD greater than 20% are qualified data ("¤").

[4] No spiking is involved in the duplicate analysis procedure, which follows the USACE/EPA Regional Implementation Manual's Quality Assurance guidelines as presented in the RIM Appendix II **(**Table II-5**)**.

For the Weaver's Cove Tier II Evaluation, three metals had a RPD greater than the 20% QC limit and resulted in a qualification of the entire batch of samples as identified below[5]:

Copper:

- The RPD between replicates was **23%** and higher than the 20% method acceptance limits. Sample result: **7.3 ppm**; duplicate result: **5.8 ppm**. The following samples were qualified: Turning Basin [TB-15(0-3),TB-15(5-11)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

- The RPD between replicates was **25%** and higher than the 20% method acceptance limits. Sample result: **19 ppm**; duplicate result: **15 ppm**. The following samples were qualified: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Lead:

- The RPD between replicates was **21%** and higher than the 20% method acceptance limits. Sample result: **27 ppm**; duplicate result: **22 ppm**. The following samples were qualified: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4)TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

- The RPD between replicates was **24%** and higher than the 20% method acceptance limits. Sample result: **210 ppm**; duplicate result: **170 ppm**. The following samples were qualified: Turning Basin [TB-4(0-6),TB-4(6-10),TB-7(0-10),TB-7(10-14),TB-12(0-3),TB-12(3-12),TB-13(0-2),TB-13(2-11),TB-14(0-12)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Mercury:

- The RPD between replicates was **31%** and higher than the 20% method acceptance limits. Sample result: **0.19 ppm**; duplicate result: **0.26 ppm**. The following samples were qualified: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Implications: For listed Copper and Lead samples, the RPDs between the sample and duplicate are similar to the QC limits, indicating reasonable duplication and associated

[5] Duplicate analyses were conducted on samples: TB-12(0-3) [for batch with 24% lead RPD]; MACAD-1(0-6) [for batch with 23% copper RPD]; TB-9(0-4) [for batch with 25% copper RPD; 21% lead RPD; 31% mercury RPD].

laboratory precision. Selected Mercury samples in the Turning Basin exhibit somewhat less laboratory precision; however, the mercury analytical results were consistent with unqualified Tier II and Tier III analytical results.

3.0 Comparison between Tier II and Tier III Analytical Results

To further assess the potential for bias to the data, Weaver's Cove compared the Tier II qualified data to the Tier II unqualified data as well as the Tier III unqualified[6] data (Tier III data are provided as Attachment 4). Weaver's Cove chose the three parameters with the "most qualified" results[7] to assess the potential for concentrations to be biased low – Lead, Mercury, and Cadmium.

Attached are three graphs[8] showing the Tier II qualified Lead, Mercury, and Cadmium data plotted and compared to:

1. Non-qualified individual sample values collected during the Tier II evaluation, grouped by geographic area[9]; and

2. Non-qualified composite values collected during the Tier III evaluation in the same geographical area. Lines are used to represent the range of values for Tier III composites in each geographical area.

The graphs clearly demonstrate that:

1. Qualified Lead, Mercury, and Cadmium values are similar to non-qualified Tier II concentrations within the same geographical area and do **not** show a pervasive low bias.

2. Qualified Lead, Mercury, and Cadmium values are generally within the range of values observed in composite samples collected during the Tier III Evaluation and do **not** show a low bias.

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[6] No Tier III metals data are qualified (other than U – Undetected).

[7] Weaver's Cove selected Lead, Mercury, and Cadmium as the parameters to study in this comparison as these parameters represented both the greatest difference between the quality assurance limit and the analytical testing result as well as the frequency for having multiple qualifiers across the data set.

[8] The graphs depict the following data types: non-qualified data (navy blue), data qualified with an "E" (turquoise), and data qualified with an "N" (yellow). The range of values in the Tier III composites for each dredging element are shown in red.

[9] Rhode Island, Federal Channel, and Turning Basin.

4.0 Conclusions

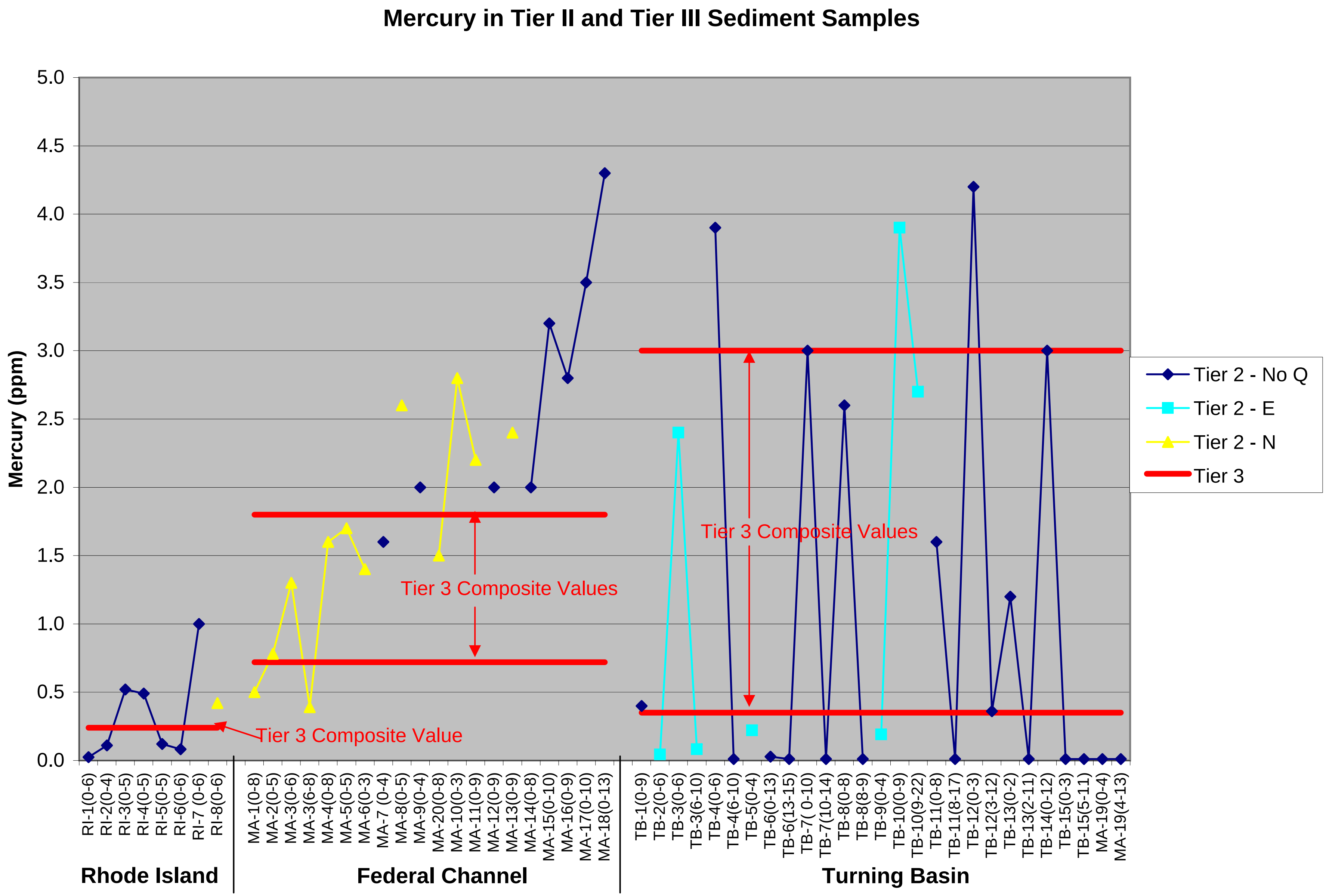
The QC limit exceedances associated with most of the Tier II qualified data points do not indicate significant bias. To be conservative, the possibility of actual bias was further evaluated by comparing qualified data to non-qualified data from existing datasets. The results of the QC analysis and comparison with non-qualified data from the Tier II and Tier III evaluations demonstrate that there is no significant low bias to the Tier II data. The Tier II data provide an adequate and representative characterization of the Project sediment.

ATTACHMENTS:

1. Graph – Mercury in Tier II and Tier III Sediment Samples
2. Graph – Lead in Tier II and Tier III Sediment Samples
3. Graph – Cadmium in Tier II and Tier III Sediment Samples
4. Table – Tier III Sediment Chemistry Results

Attachment 1

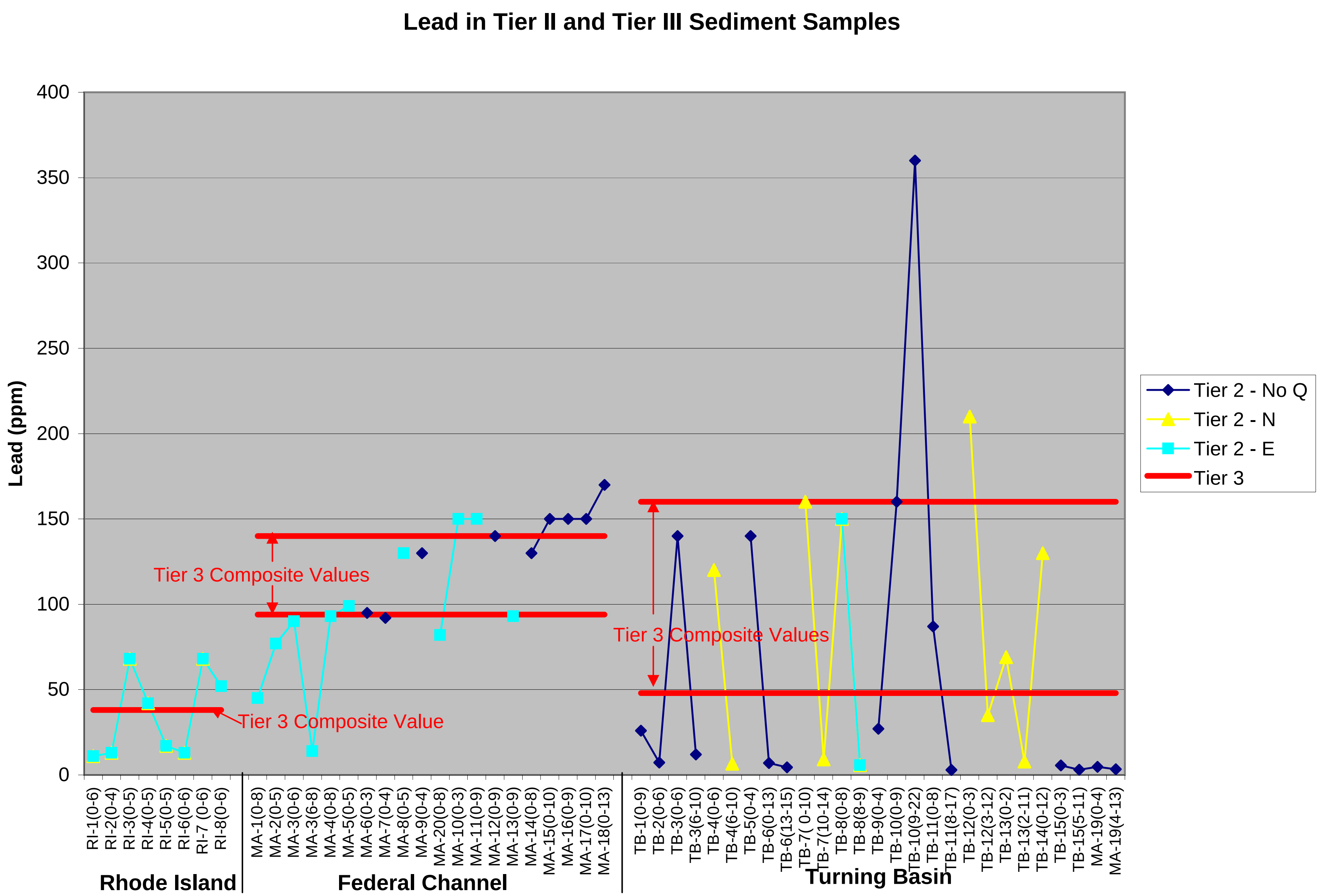
Graph - Mercury in Tier II and Tier III Sediment Samples



Prepared in response to MADEP question regarding data quality, May 2007

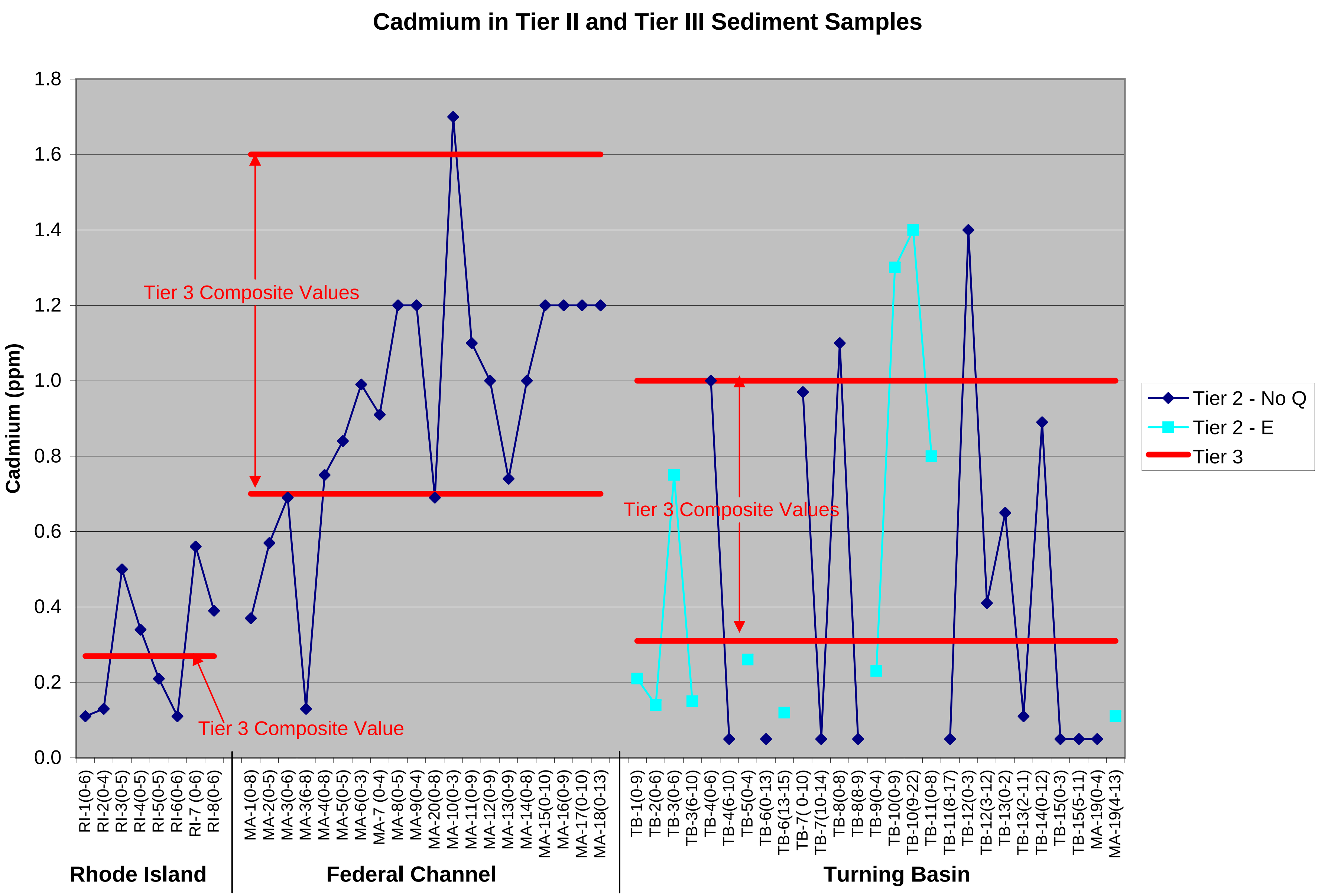
Attachment 2

Graph - Lead in Tier II and Tier III Sediment Samples


Lead in Tier II and Tier III Sediment Samples
Lead (ppm)
400
350
300
250
200
150
100
50
0
Tier 3 Composite Values
Tier 3 Composite Value
Tier 3 Composite Values
Tier 2 - No Q
Tier 2 - N
Tier 2 - E
Tier 3
RI-1(0-6)
RI-2(0-4)
RI-3(0-5)
RI-4(0-5)
RI-5(0-5)
RI-6(0-6)
RI-7 (0-6)
RI-8(0-6)
MA-1(0-8)
MA-2(0-5)
MA-3(0-6)
MA-3(6-8)
MA-4(0-8)
MA-5(0-5)
MA-6(0-3)
MA-7(0-4)
MA-8(0-5)
MA-9(0-4)
MA-20(0-8)
MA-10(0-3)
MA-11(0-9)
MA-12(0-9)
MA-13(0-9)
MA-14(0-8)
MA-15(0-10)
MA-16(0-9)
MA-17(0-10)
MA-18(0-13)
TB-1(0-9)
TB-2(0-6)
TB-3(0-6)
TB-3(6-10)
TB-4(0-6)
TB-4(6-10)
TB-5(0-4)
TB-6(0-13)
TB-6(13-15)
TB-7(0-10)
TB-7(10-14)
TB-8(0-8)
TB-8(8-9)
TB-9(0-4)
TB-10(0-9)
TB-10(9-22)
TB-11(0-8)
TB-11(8-17)
TB-12(0-3)
TB-12(3-12)
TB-13(0-2)
TB-13(2-11)
TB-14(0-12)
TB-15(0-3)
TB-15(5-11)
MA-19(0-4)
MA-19(4-13)
Rhode Island
Federal Channel
Turning Basin

Attachment 3

Graph - Cadmium in Tier II and Tier III Sediment Samples



Cadmium in Tier II and Tier III Sediment Samples
Cadmium (ppm)
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Tier 3 Composite Values
Tier 3 Composite Values
Tier 3 Composite Value
Tier 2 - No Q
Tier 2 - E
Tier 3
RI-1(0-6)
RI-2(0-4)
RI-3(0-5)
RI-4(0-5)
RI-5(0-5)
RI-6(0-6)
RI-7 (0-6)
RI-8(0-6)
MA-1(0-8)
MA-2(0-5)
MA-3(0-6)
MA-3(6-8)
MA-4(0-8)
MA-5(0-5)
MA-6(0-3)
MA-7 (0-4)
MA-8(0-5)
MA-9(0-4)
MA-20(0-8)
MA-10(0-3)
MA-11(0-9)
MA-12(0-9)
MA-13(0-9)
MA-14(0-8)
MA-15(0-10)
MA-16(0-9)
MA-17(0-10)
MA-18(0-13)
TB-1(0-9)
TB-2(0-6)
TB-3(0-6)
TB-3(6-10)
TB-4(0-6)
TB-4(6-10)
TB-5(0-4)
TB-6(0-13)
TB-6(13-15)
TB-7(0-10)
TB-7(10-14)
TB-8(0-8)
TB-8(8-9)
TB-9(0-4)
TB-10(0-9)
TB-10(9-22)
TB-11(0-8)
TB-11(8-17)
TB-12(0-3)
TB-12(3-12)
TB-13(0-2)
TB-13(2-11)
TB-14(0-12)
TB-15(0-3)
TB-15(5-11)
MA-19(0-4)
MA-19(4-13)
Rhode Island
Federal Channel
Turning Basin

Attachment 4

Table – Tier III Sediment Chemistry Results

Tier III Bulk Chemistry Results Summary
Weaver's Cove Energy, LLC

Parameter	Analytical Method	Reporting Limit*	S-Bend Composite		Access Channel Composite		Upper Federal Channel Composite	
PAHs	GC/MS-SIM	ppb	ppb	(Q)	ppb	(Q)	ppb	(Q)
Naphthalene	8270	10	190		52		120	
Acenaphthylene	8270	10	170		34		69	
Acenaphthene	8270	10	66		13	U	26	
Fluorene	8270	10	100		24		42	
Phenanthrene	8270	10	600		120		260	
Anthracene	8270	10	260		61		100	
Fluoranthene	8270	10	1100		180		430	
Pyrene	8270	10	1400		350		640	
Benzo[a]anthracene	8270	10	560		120		250	
Chrysene	8270	10	700		140		300	
Benzo[b]fluoranthene	8270	10	650		120		280	
Benzo[k]fluoranthene	8270	10	520		120		230	
Benzo[a]pyrene	8270	10	710		150		320	
Indeno[1,2,3-cd]pyrene	8270	10	470		91		200	
Dibenz[a,h]anthracene	8270	10	150		30		66	
Benzo[g,h,i]perylene	8270	10	500		100		230	
PCB Congeners	GC/ECD	ppb	ppb	(Q)	ppb	(Q)	ppb	(Q)
BZ 8*	8082	1	3.6		1.3	U	2.5	
BZ 18*	8082	1	1.7	U	1.3	U	1.5	U
BZ 28*	8082	1	4.2		1.3	U	3.3	
BZ 44*	8082	1	2.4		1.3	U	1.5	U
BZ 49	8082	1	3.8		1.3	U	1.9	
BZ 52*	8082	1	5.1		1.3	U	6.9	
BZ 66*	8082	1	4.9		1.3	U	1.5	U
BZ 87	8082	1	2.8		1.3	U	1.7	
BZ 101*	8082	1	11		1.3	U	5.1	
BZ 105*	8082	1	3.5	I	1.3	U	1.9	I
BZ 118*	8082	1	9.2		1.3	U	5	
BZ 128*	8082	1	1.7	U	1.3	U	1.5	U
BZ 138*	8082	1	12	I	1.3	U	6.4	I
BZ 153*	8082	1	6.2		1.3	U	3.8	
BZ 170*	8082	1	4		1.3	U	1.5	U
BZ 180*	8082	1	6.5	I	1.3	U	2.2	I
BZ 183	8082	1	1.7	U	1.3	U	1.5	U
BZ 184	8082	1	1.7	U	1.3	U	4.3	P
BZ 187*	8082	1	1.7	U	1.3	U	2.6	I
BZ 195*	8082	1	1.7	U	1.3	U	1.5	U
BZ 206*	8082	1	4.2		1.3	U	2.2	
BZ 209*	8082	1	3.7		1.3	U	1.8	
Total PCB (Sum of Congeners* x 2)			174.6		46.8		105.4	

Tier III Bulk Chemistry Results Summary
Weaver's Cove Energy, LLC

Parameter	Lower Federal Channel Composite		East Channel Composite		Turning Basin North Composite		Turning Basin South Composite	
PAHs	ppb	(Q)	ppb	(Q)	ppb	(Q)	ppb	(Q)
Naphthalene	39		390		290		240	
Acenaphthylene	21		390		200		180	
Acenaphthene	14	U	130		78		78	
Fluorene	14	U	170		110		82	
Phenanthrene	69		1000		670		510	
Anthracene	29		660		300		360	
Fluoranthene	110		1800		1200		920	
Pyrene	170		2700		1600		1200	
Benzo[a]anthracene	63		1200		650		560	
Chrysene	77		1300		800		740	
Benzo[b]fluoranthene	78		820		690		600	
Benzo[k]fluoranthene	72		880		690		520	
Benzo[a]pyrene	88		1300		830		720	
Indeno[1,2,3-cd]pyrene	64		660		540		410	
Dibenz[a,h]anthracene	21		240		180		130	
Benzo[g,h,i]perylene	70		690		560		490	
PCB Congeners	ppb	(Q)	ppb	(Q)	ppb	(Q)	ppb	(Q)
BZ 8*	1.8		2.6		3.8		3.5	
BZ 18*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 28*	1.8		4.3		5.1		13	
BZ 44*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 49	1.4	U	1.6		2.8		2.8	
BZ 52*	2.2		6.2		9.2		6.2	
BZ 66*	1.4	U	1.6	U	5.9		1.5	U
BZ 87	1.4	U	3.5		3.2		2.5	
BZ 101*	3.3		8.1		9.7		9.2	
BZ 105*	1.4	U	3.7		1.6	U	1.8	I
BZ 118*	1.9		5.5		9.3		6.8	
BZ 128*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 138*	1.7	I	9.1	I	12	I	7.1	I
BZ 153*	1.5		3.3		6.5		5	
BZ 170*	1.4	U	4.4		4.6		5.6	
BZ 180*	1.4	U	1.6	U	3.2	I	4.7	I
BZ 183	1.4	U	1.6	U	1.6	U	1.5	U
BZ 184	1.4	U	4.8		1.6	U	1.5	U
BZ 187*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 195*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 206*	1.4	U	8.3		6.1		2.7	
BZ 209*	1.4	U	9.6		10		2.4	
Total PCB (Sum of Congeners* x 2)	59.2		152.6		190		154	

Tier III Bulk Chemistry Results Summary
Weaver's Cove Energy, LLC

Parameter	Analytical Method	Reporting Limit*	S-Bend Composite		Access Channel Composite		Upper Federal Channel Composite	
Pesticides	GC/ECD	ppb	ppb	(Q)	ppb	(Q)	ppb	(Q)
4,4'-DDD	8081A	1			1.3	U		
4,4'-DDE	8081A	1	5.8		1.3	U	2.8	
4,4'-DDT	8081A	1			1.3	U		
Aldrin	8081A	1			1.3	U		
alpha-Chlordane	8081A	1			1.3	U		
cis-Nonachlor	8081A	1			1.3	U		
Dieldrin	8081A	1			1.3	U		
Endosulfan I	8081A	1			1.3	U		
Endosulfan II	8081A	1			1.3	U		
Endrin	8081A	1			1.3	U		
gamma-BHC	8081A	1			1.3	U		
gamma-Chlordane	8081A	1			1.3	U		
Heptachlor	8081A	1			1.3	U		
Heptachlor epoxide (B)	8081A	1			1.3	U		
Hexachlorobenzene	8081A	1			1.3	U		
Methoxychlor	8081A	1			1.3	U		
Oxychlordane	8081A	1			1.3	U		
trans-Nonachlor	8081A	1			1.3	U		
Toxaphene	8081A	25			32	U		
Metals		ppm	ppm	(Q)	ppm	(Q)	ppm	(Q)
Arsenic	6020A	0.4	15		9.7		11	
Cadmium	6020A	0.07	0.96		0.31		0.7	
Chromium	6020A	0.5	260		54		130	
Copper	6020A	0.5	120		26		82	
Lead	6020A	0.5	140		48		94	
Mercury	7471A	0.02	1.4		0.35		0.72	
Nickel	6020A	0.5	31		15		26	
Zinc	6020A	1	260		91		200	
Physical								
Total Organic Carbon (Run 1) (%)	9060		4.2		1.9		3.5	
Total Organic Carbon (Run 2) (%)	9060		4.1		2		3.2	
Percent Moisture	2540G		60		46		56	

Parameter	Lower Federal Channel Composite		East Channel Composite		Turning Basin North Composite		Turning Basin South Composite	
Pesticides	ppb	(Q)	ppb	(Q)	ppb	(Q)	ppb	(Q)
4,4'-DDD			6.5					
4,4'-DDE			4.5					
4,4'-DDT			2.9					
Aldrin			1.6	U				
alpha-Chlordane			1.6	U				
cis-Nonachlor			2.1					
Dieldrin			1.6	I				
Endosulfan I			1.6	U				
Endosulfan II			1.6	U				
Endrin			1.6	U				
gamma-BHC			1.6	U				
gamma-Chlordane			1.6	U				
Heptachlor			1.6	U				
Heptachlor epoxide (B)			1.6	U				
Hexachlorobenzene			1.6	U				
Methoxychlor			1.6	U				
Oxychlordane			1.6	U				
trans-Nonachlor			1.6	U				
Toxaphene			39	U				
Metals	ppm	(Q)	ppm	(Q)	ppm	(Q)	ppm	(Q)
Arsenic	9.7		15		18		14	
Cadmium	0.27		1.6		1		0.79	
Chromium	62		140		280		270	
Copper	36		94		120		110	
Lead	38		140		160		110	
Mercury	0.24		1.8		2.2		3	
Nickel	23		24		29		23	
Zinc	110		310		260		210	
Physical								
Total Organic Carbon (Run 1) (%)	2.2		4.1		4.6		4.6	
Total Organic Carbon (Run 2) (%)	2.5		4		5		4.7	
Percent Moisture	52		56		58		54	

*Reporting Limits taken from USEPA/USACE Final Regional Implementation Manual, Tables 2-3, April 2004.

NOTE: RIM Table 3 does not list RLs for pesticides alpha-Chlordane, gamma-BHC, and gamma-chlordane, so an RL of 1ppb was chosen based on other chemically similar pesticides.

P - Greater than 40% RPD between the two columns; the higher value is reported according to the method.

I - Due to interference, the lower value is reported.

U - The analyte was analyzed for but not detected at the Reporting Limit; therefore, the sample is conservatively reported at the Reporting Limit.

Parameters not analyzed (as specified in the US Army Corp's Sampling Plan).

From: Barry Fogel
Sent: Monday, June 11, 2007 5:39 PM
To: 'Lehan, Richard (DEP)'
Cc: Weinberg, Philip (DEP); Langley, Lealdon (DEP)
Subject: Weaver's Cove Permits

Rich - Attached is a letter transmitting information that has been provided earlier by separate emails regarding the WQC, as well as the c. 91 navigation information summary DEP asked for, and a copy of a recent letter to the USCG about their May 9 letter.

Ted Gehrig and I would like to followup with Phil, Lealdon and you to discuss WCE's position regarding the "stay" (as described in Ted's recent letter) and the options WCE believes it should have under DEP's regulations and the MOA regarding final technical permit reviews.

Thanks - Barry

<<Letter to RLehan re permits (6-11-07).pdf>>

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June 11, 2007

BY ELECTRONIC MAIL
AND FIRST CLASS MAIL

Richard Lehan, Esq.
Massachusetts DEP
One Winter Street
Boston, MA 02108

Re: Weaver's Cove Energy

Dear Rich:

This letter is sent on behalf of Weaver's Cove Energy ("WCE") to summarize the additional information that WCE has provided recently to the Massachusetts Department of Environmental Protection ("DEP") in connection with review of the Water Quality Certification ("WQC") application and Chapter 91 permit application for the dredging activity, and the Chapter 91 license application for the LNG terminal shoreline facilities.

During our April 28, 2007, meeting regarding the WQC monitoring plan, DEP requested additional information about the Tier II and Tier III data developed by WCE for dissolved metals. One item that WCE agreed to provide was a written summary comparing actual dilution effects that will occur within the river system during dredging operations with the extremely conservative dilution effect that was obtained from the laboratory-based elutriate sample preparation procedure. By electronic mail on May 31, 2007, I provided you with that written summary (see copy enclosed). A second item that WCE agreed to provide was an explanation of the laboratory QA/QC qualifications for metals data included with the Tier II sediment chemistry results. By electronic mail on June 7, 2007, I provided you with that written summary (see copy enclosed).

These two submittals were the only deliverables identified at the April 28 meeting. Consequently, WCE remains prepared to meet immediately with DEP to finalize the water quality monitoring plan, mixing zone criteria, and the Applied Science Associates ("ASA") model verification plan.

With respect to the Chapter 91 permit and license applications for WCE's dredging activity and terminal facilities, DEP made one additional request at the meeting on April 28, 2007. Specifically, DEP asked WCE to provide a summary of sources of information in the permitting record, including the MEPA filings, that addressed the issue of potential effects on navigation and the requirement that the project will not significantly interfere with public rights of navigation. To address this inquiry, WCE has developed a list of various sources of information that reference this issue (see copy enclosed).

The only other open item for pending applications for this project was related to the Chapter 91 license application for the Mill River Pipeline river crossing segment. This was addressed in my letter to you dated June 6, 2007 (see copy enclosed).

In a letter to Acting Commissioner O'Donnell dated June 7, 2007, WCE challenged DEP's indication of a "stay" in completion of technical reviews for the referenced permits. WCE was not given any opportunity to address DEP's claim that "the U.S. Coast Guard has informed MassDEP that it expects to make a final assessment of whether the waterway is suitable for the Weaver's Cove smaller ship proposal this summer." WCE questions whether the full evaluation necessary for the U.S. Coast Guard to issue a Letter of Recommendation can or will be completed this summer, and WCE has raised this concern in a letter to the U.S. Coast Guard dated June 6, 2007 (see copy enclosed). Thus, if DEP's decision to impose a "stay" was based upon an assumption that it would extend for only a few months, it appears to have been a hasty decision that deserves reexamination.

As recently as one month ago, WCE received a clear indication from you that all remaining permits should be issued by the end of June. WCE calls upon DEP to arrange a final meeting with technical review staff regarding the information described above so DEP can complete these final permit decisions within the time frame already discussed.

Thank you.

Sincerely,

Barry P. Fogel

BPF/pf
Enclosures

cc: Weaver's Cove Energy, LLC
Mill River Pipeline, LLC
Phil Weinberg, DEP
Lealdon Langley, DEP
Epsilon Associates, Inc.

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Weavers Cove Energy, Dredging Water Quality Certification Elutriate Dilution Analysis

By: Craig Swanson, ASA

Date: May 31, 2007

Overview

During discussions with the Department of Environmental Protection (DEP) about the application for Water Quality Certification for the Weaver's Cove Energy (WCE) dredging activities, WCE has pointed out that the results of the 2004 and 2006 Tier III elutriate analyses indicate that trace levels of dissolved metals released into the water column during dredging will *not* result in exceedances of water quality standards. DEP has asked whether WCE can provide further support for this conclusion in light of the different results obtained during the Tier II elutriate analyses conducted in 2003. To address this question, ASA has conducted an analysis that compares the actual dilution effect that will occur within the river system during dredging operations with the extremely conservative dilution effect that was obtained from the laboratory-based elutriate sample preparation procedure.

Elutriate Test Results

WCE's first elutriate analyses were completed in 2003 during the Tier II sediment studies. In an elutriate test, water is mixed with sediment and the chemical properties of the water phase are then studied.[1] While most chemical constituents in the Tier II elutriate samples were below the EPA acute and chronic Aquatic Life water quality criteria, copper and zinc concentrations exceeded the EPA criteria.[2] Tier II elutriate test results for copper and zinc are summarized in Table 1 below.

Table 1. Summary of 2003 Tier II elutriate analyses for surface sediments in the Turning Basin

Metal	EPA Water Quality Criteria	EPA Water Quality Criteria	Southern Turning Basin	Southern Turning Basin	Northern Turning Basin	Wooden Pier
	Acute	Chronic	TB-3 (0-6)	TB-3 (6-10)	TB-11 (11-17)	TB-10 (0-9)
	(µg/L)	(µg/L)	(µg/L)	T(µg/L)	(µg/L)	(µg/L)
Copper	4.8	3.1	42	17	16	56
Zinc	90	81	200	57	64	380

[1] Elutriate samples were prepared by mixing sediment and water in a 1:4 ratio, mixing vigorously for 30 minutes, allowing the mixture to settle, and then siphoning off the supernatant for analysis.

[2] Zinc water quality criteria were exceeded in samples TB-10 (0-9) and TB-3 (0-6); copper water quality criteria were exceeded in each of the 7 elutriate samples.

The highest Tier II elutriate concentrations measured for both copper and zinc occurred when evaluating sediments collected near the Wooden Pier (sample location TB-10). The existing Wooden Pier is located adjacent to the proposed LNG terminal site on the federal Turning Basin.

In 2004, the Project conducted an extensive Tier III sediment study in support of its proposal for ocean disposal of suitable sediments. Further elutriate testing was conducted during the 2004 Tier III evaluation. Elutriate testing was conducted using sediments collected in the Turning Basin with the exception of the area immediately around sample location TB-10. Sediments from the location TB-10 were subsequently sampled and tested during the further Tier III studies conducted in 2006.

In contrast to the initial 2003 Tier II elutriate results, the 2004 and 2006 Tier III elutriate results were below the acute and chronic Aquatic Life criteria for **all** constituents measured (including copper and zinc). More specifically, the 2006 TB-10 Tier III elutriate results for zinc were a factor of 10 lower than acute and chronic Aquatic Life criteria, while the 2006 TB-10 Tier III elutriate results for copper were a factor of three lower than the acute and chronic Aquatic Life criteria.

Notwithstanding the clear indication from the 2004 and 2006 Tier III elutriate results that trace levels of dissolved metals released into the water column during dredging will *not* result in exceedances of water quality standards, DEP has requested additional analysis that would support this conclusion in light of the earlier Tier II (2003) analyses.

To address this question, ASA has evaluated how the dilution effect within the river system that will occur during dredging operations compares to the conservative dilution (4 to 1 ratio of water to sediment) used during the laboratory based elutriate test procedure. As noted above, the highest elutriate concentrations for both copper and zinc occurred when testing Wooden Pier (TB-10) samples collected from a location immediately adjacent to the Turning Basin. The analysis presented below is based on these 2003 Tier II TB-10 sediment testing results. Accordingly, this analysis represents the most conservative (worst case) calculation of potential effects.

<u>Calculation of Dilution of Dissolved Phased Copper and Zinc During Dredging</u>

Absent any consideration of in river dilution, elutriate results provide an **extremely** conservative assessment of potential dissolved phase metals during dredging. Elutriate preparation involves significant agitation of sediment and river water, much more mixing than will occur during the mechanical dredging technique proposed by Weaver's Cove (especially when considering Weaver's Cove's commitment to use a closed bucket and to allow no deliberate scow overflow). The elutriate preparation for Tier II (2003) and Tier III (2004 and 2006) analyses included mechanically and physically mixing one part sediment to four parts water for the intended purpose of encouraging greater dissolution of chemical constituents in the sediments into the water column. The effect is similar to hydraulically dredging with subsequent pumping of the dredged material slurry through a pipe to a remote disposal location. Mechanical dredging, as proposed by Weaver's Cove, will result in significantly less water/sediment interface. Therefore, the elutriate preparation and subsequent analytical results reported in the Tier II and Tier III testing programs both significantly over-predicted chemical concentrations dissolved in the water column.

The following calculations provide an estimate of the effects of dilution on copper and zinc (or other chemical constituents) that may be released during dredging activities. The approach for calculating the likely dilution that would occur during actual dredging uses the simple 1-dimensional advection-diffusion equation that simulates the release of a constituent in a flowing body of water. The results indicate concentration as a function of distance from the dredge. The highest concentration is located at the dredging source location. Accordingly, this analysis will focus on the near dredge area. The constituent source strength is based on measured elutriate concentrations described below.

The 1-dimensional advection-diffusion equation is given as:

$$\frac{\partial C}{\partial t} = C\frac{\partial U}{\partial x} + D\frac{\partial^2 C}{\partial x^2}$$

where

C is constituent concentration (μg/L, microgram per liter)
U is current speed (m/s, meters/second)
D is longitudinal diffusivity (m^2/s)
t is time (s, seconds)
x is downstream distance (m, meters)

The solution of this equation is given in Ward and Espey (1971) in terms of the error function

$$C = \frac{W}{2AU}\exp(\frac{xU}{2D})\{\left[erf(\frac{x+Ut}{\sqrt{4Dt}}) \pm 1\right]\exp(+\frac{xU}{2D}) - \left[erf(\frac{x-Ut}{\sqrt{4Dt}}) \pm 1\right]\exp(-\frac{xU}{2D})\}$$

where

W is source mass rate (μg/s)
A is cross sectional area (m^2)

The total source mass rate is taken from the SSFATE[3] input for dredging of surface sediments in the Turning Basin. This location has the highest production rate (10,000 yds^3/day) of the four dredging reaches.[4] The cross sectional area is defined as the water depth times the plume width. The water depth is nominally 33 ft (10 m) and the minimum width of the resulting plume is 3 m, approximately the width of the 26 yd^3 bucket used for dredging these sediments. In this analysis, the "plume" width is associated with the physical point of dredging, as compared to the larger areas of dredging-induced "plumes" described in the MEPA filings. Thus, the production rate is a conservatively high estimate and the plume width is a conservatively low estimate, resulting in the *most conservative* concentration estimate.

The source mass rate and cross sectional area are related to the portion of the water column where sediment is released. Table 2 summarizes these areas and rates taken

[3] The SSFATE model has been extensively discussed in the permitting record for Weaver's Cove and that discussion is not repeated here.

[4] Concentration scales linearly with dredge production rate (lower dredging rates lower concentrations)

from the SSFATE model inputs for each layer of the water column. The total release rate of sediment into the water column is 1.32% of the dredging rate[5] or 0.001168 m^3/s.

Table 2. Summary of inputs from SSFATE model used in this analysis.

Layer	% of 10 m Water Depth	Layer Thickness	% of Total Release Rate	Layer Release Rate
		(m)		(m^3/s)
Surface	20	2	20	0.000234
Mid	60	6	30	0.000350
Bottom	20	2	50	0.000584

The metals release rates are determined from the sediment loss rate and the elutriate concentration. Since the elutriate concentration for dissolved metals is based on a volume mixture of 1 L of sediments to 4 L of water, the metals release rate, or model source strength, is found by multiplying four times the elutriate concentration, converting units, and multiplying by the sediment release rate. The results are shown in Table 3.

Table 3. Copper and zinc source strengths for Wooden Pier TB-10 (0-9) sample

Layer	Sediment Release Rate	Copper Source Strength	Zinc Source Strength
	(m^3/s)	(µg/s)	(µg/s)
Surface	0.000234	52.3	355.1
Mid	0.000350	78.5	532.7
Bottom	0.000584	130.8	887.8

Using the copper and zinc source strengths and the appropriate cross section areas in the equation for concentration, the following results (Table 4) were obtained for the three layers. The sensitivity to ambient river currents (from 10 cm/s[6] to 60 cm/s taken from previous field observations and modeling (Swanson et al., 2003) is also shown, as are the EPA Acute and Chronic Water Quality Criteria for comparison.

[5] Here again, this analysis uses a very conservative (high) estimate of sediment release rate. ASA believes this release rate is roughly six times greater than predicted values. The conservative nature of this release rate has been extensively discussed during the permitting review of the Weaver's Cove project and is not repeated here.

[6] 10 cm/s is approximately 19.7 ft/min or 0.22 miles/hr; 60 cm/s is approximately 118 ft/min or 1.34 miles/hr.

Table 4. Peak concentrations of copper and zinc for modeled layers at the dredge site and at a range of ambient river current conditions.

Layer	Ambient Current	Peak Copper Concentration	Peak Zinc Concentration
	(cm/s)	(µg/L)	(µg/L)
Surface	10	0.080	0.54
	20	0.044	0.30
	30	0.029	0.20
	40	0.022	0.15
	50	0.017	0.12
	60	0.015	0.10
Mid	10	0.040	0.27
	20	0.022	0.15
	30	0.015	0.10
	40	0.011	0.07
	50	0.007	0.06
	60	0.007	0.05
Bottom	10	0.200	1.36
	20	0.109	0.74
	30	0.073	0.49
	40	0.055	0.37
	50	0.044	0.30
	60	0.036	0.25
EPA Acute (WQC)		4.8	90
EPA Chronic WQC		3.1	81

Based upon these calculations, it can be clearly seen that the peak concentrations from the release of dissolved phase copper and zinc during actual dredging will be significantly below the EPA chronic and acute water quality criteria within the immediate area of the dredge, and beyond, when the real world effects of dredging technique and ambient dilution are considered. Thus, the impacts from trace levels of metals release into the water column during dredging operations are shown to be insignificant and much lower than the levels measured during the very conservative elutriate testing program.

References

Swanson, C., D. French McCay, S. Subbayya, J. Rowe, P. Hall, T. Isaji, 2003. Modeling dredging-induced suspended sediment and the environmental effects in Mt. Hope Bay and the Taunton River for the proposed Weaver's Cove Energy, LLC, liquefied natural gas import terminal, Prepared for Weaver's Cove Energy, LLC, Fall River, Massachusetts, ASA Project 02-200, 91 p. plus appendices.

Ward, G. and W. Espey (eds.), 1971. Estuarine modeling: an assessment. Report 16070-DZV02/71. Environmental Protection Agency, U.S. Government Printing Office.

Summary of Lab QA/QC for Qualified Metals Data
Weaver's Cove Tier II Sediment Chemistry Results (March 2003)
Prepared for MA DEP Based on Questions at the April 28, 2007 WQC Meeting

1.0 Preamble

The Massachusetts Department of Environmental Protection (MA DEP) requested additional information regarding the qualification of metals analytical data for sediment samples collected by Weaver's Cove Energy ("Weaver's Cove") during its Tier II Evaluation performed in 2003. Specifically, MADEP requested detailed results of the Quality Control ("QC") analyses and an assessment of the potential for a "low bias" in the metals data. This document has been prepared by Weaver's Cove to respond to this MA DEP inquiry.

During the 2003 Tier II evaluation, Weaver's Cove performed a vigorous sediment characterization by individually analyzing 55 discrete sediment stratum samples collected at 43 core locations within the proposed dredging limits. Section 5 of Weaver's Cove's Dredging Program, dated December 2003, provides a summary of the field efforts and the physical and chemical results of this comprehensive sediment characterization. This sediment characterization was performed in strict accordance with a U.S. Army Corps of Engineers ("USACE")-issued Sampling and Analysis Plan specific to this effort.

Subsequent to the Tier II Evaluation, Weaver's Cove performed a Tier III Evaluation in 2004 in accordance with a second USACE-issued Sampling and Analysis Plan. In the Tier III Evaluation, sediment was collected from multiple core locations and then composited to generate 7 composite samples, each representative of a geographic area within the dredging footprint (i.e, Northern Turning Basin, Southern Turning Basin, Access Channel, S-Bend, East Channel, Upper Federal Channel, Lower Federal Channel). Each of the 7 composite samples was chemically analyzed. Both the Tier II and Tier III Evaluations were conducted in accordance with federal and regional guidance manuals, including the USACE/Environmental Protection Agency ("EPA") Regional Implementation Manual for Evaluating Dredged Material for Disposal in New England ("RIM").

As detailed below, comparing the analytical results from the Tier II and Tier III Evaluations[1] demonstrates that qualified metals values are similar to non-qualified Tier II and Tier III data, with no indication of a low bias. This comparison demonstrates the consistency of the sediment characterization, and, in turn, the quality and reliability of the analytical results. To echo these findings, in their jointly-issued Suitability Determination, the USACE and EPA stated that the sediments have been adequately and thoroughly characterized.

[1] The Tier II and Tier III Evaluations sampled virtually the same sediment, though as individual samples from each stratum in Tier II versus composited samples from each stratum in Tier III.

2.0 Discussion of Qualified Data

The Tier II metals sediment data for the Weaver's Cove evaluation contain three types of qualifications. These qualifications are detailed below.

E - Estimated due to Interference:

The "E" qualifier pertains to results of the serial dilution analysis, which is a measure of potential bias. As part of the laboratory's QC procedures, a serial dilution analysis is performed once with each "batch" of samples or every 20 samples, whichever is less. The results of the serial dilution analysis are then applied to all the samples in the batch. To perform the serial dilution analysis, the selected sample is first run "straight" (e.g., undiluted) and then with a 1:5 dilution. The sample result and serial dilution result are then compared on a parameter by parameter basis by calculating a Relative Percent Difference ("RPD") between the two values. Parameters with a RPD above the QC acceptance limits of 10% result in qualification of all samples in the batch as estimated data ("E"). If the RPD is greater than 10% and the serial dilution result is greater than the sample result, the sample result has a potential low bias. If the RPD is greater than 10% and the serial dilution result is less than the sample result, the sample result has a potential high bias.

For the Weaver's Cove Tier II evaluation, comparison of the sample result and the serial dilution result[2] was greater than the 10% method acceptance limit for the following metals:

Cadmium:

- The difference between the sample result and serial dilution result was **12%** and greater than the 10% method acceptance limit. Sample result: **0.23 ppm**; serial dilution result: **0.20 ppm.** The following samples were qualified for a potential high bias: Turning Basin [TB-2(0-6),TB-3(0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

- The difference between the sample result and serial dilution result was **20%** and greater than the 10% method acceptance limit. Sample result: **0.16 ppm**; serial dilution result: **0.19 ppm.** The following samples were qualified for a potential low bias: Turning Basin [TB-1(0-9),TB-6 (13-15),TB-11(0-8),TB-11(8-17),MA-19(4-13)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

[2] Serial dilution analyses were conducted on samples: RI-7(0-6) [for batch with 11% lead difference]; MA CAD-2(0-10) [for batch with 20% cadmium difference]; TB-9(0-4) [for batch with 12% cadmium difference; 12% chromium difference; 17% mercury difference]; MA-3(6-8) [for batch with 15% copper difference; 16% lead difference; 12% nickel difference].

Chromium:

- The difference between the sample result and serial dilution result was **12%** and greater than the 10% method acceptance limit. Sample result: **38 ppm**; serial dilution result: **43 ppm.** The following samples were qualified for a potential low bias: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Copper:

- The difference between the sample result and serial dilution result was **15%** and greater than the 10% method acceptance limit. Sample result: **13 ppm**; serial dilution result: **15 ppm.** The following samples were qualified for a potential low bias: Turning Basin [none]; S-Bend [MA-10(0-3),MA-11(0-9),MA-13(0-9)], MA Federal Channel [MA-1(0-8),MA-2(0-5),MA-3(0-6),MA-3(6-8),MA-4(0-8),MA-5(0-5),MA-6(0-3),MA-8(0-5),MA-20(0-8)]; Rhode Island [RI-8(0-6)].

Lead:

- The difference between the sample result and serial dilution result was **11%** and greater than the 10% method acceptance limit. Sample result: **68 ppm**; serial dilution result: **75 ppm.** The following samples were qualified for a potential low bias: Turning Basin [TB-8(0-8),TB-8(8-9)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [RI-1(0-6),RI-2(0-4),RI-3(0-5),RI-4(0-5),RI-5(0-5),RI-6(0-6), RI-7(0-6)].

- The difference between the sample result and serial dilution result was **16%** and greater than the 10% method acceptance limit. Sample result: **14 ppm**; serial dilution result: **16 ppm.** The following samples were qualified for a potential low bias: Turning Basin [none]; S-Bend [MA-10 (0-3),MA-11(0-9),MA-13(0-9)]; MA Federal Channel [MA-1(0-8),MA-2(0-5),MA-3(0-6),MA-3(6-8),MA-4(0-8),MA-5(0-5),MA-6(0-3),MA-8(0-5),MA-20(0-8)]; Rhode Island [RI-8(0-6)].

Mercury:

- The difference between the sample result and serial dilution result was **17%** and greater than the 10% method acceptance limit. Sample result: **0.19 ppm**; serial dilution result: **0.22 ppm.** The following samples were qualified for a potential low bias: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Nickel:

- The difference between the sample result and serial dilution result was **12%** and greater than the 10% method acceptance limit. Sample result: **19 ppm**; serial dilution result: **22 ppm.** The following samples were qualified for a potential low bias: Turning Basin [none]; S-Bend [MA-10 (0-3),MA-11(0-9),MA-13(0-9)]; MA Federal Channel [MA-1(0-8),MA-2(0-5),MA-3(0-6),MA-3(6-8),MA-4(0-8),MA-5(0-5),MA-6(0-3),MA-8(0-5),MA-20(0-8)]; Rhode Island [RI-8(0-6)].

Implications: For all qualified parameters, the differences between the sample and serial dilution results are not significant, indicating no significant bias to the data. Further, the parameters with the greatest percent difference between the sample result and serial dilution result – lead, mercury, and cadmium – had concentrations consistent with the unqualified data in the Tier II Evaluation and within the concentration range of the composited sample results of the Tier III Evaluation (as further discussed in the Comparison section below).

N – Spike Recovery outside Control Limits:

The "N" qualifier pertains to the spike analysis, which is a measure of potential bias. For this analysis, known concentrations of target analytes are added to a sample (the "spike"), which is then analyzed. The intention for the spike analyses is a means to assess the accuracy of the lab equipment by testing for known concentrations. As part of the laboratory's QA/QC procedures, a spike analysis was run with each "batch" of samples or every 20 samples, whichever is less. Therefore, biases due to spike analyses result in qualified data for all of the samples in the associated batch on a parameter by parameter basis. The QC limits for spike recovery are 75-125%. Samples associated with the spike recovered outside the QC limits are qualified data ("N"). Higher recovery than the QC limits indicates a potential high bias, lower recovery than the QC limits indicates a potential low bias.

For the Weaver's Cove Tier II Evaluation, the spike was recovered outside the QC limits for three metals[3]:

Lead:

- Recovery of lead from the spike sample was **74%** and outside of the 75% - 125% method acceptance range. The following samples were qualified: Turning Basin [TB-8(0-8),TB-8(8-9)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [RI-1(0-6),RI-2(0-4),RI-3(0-5),RI-4(0-5),RI-5(0-5),RI-6(0-6),RI-7(0-6)].

- Recovery of lead from the spike sample was **57%** and outside of the 75% - 125% method acceptance range. The following samples were qualified: Turning Basin [TB-4(0-6),TB-4(6-10),TB-7(0-10),TB-7(10-14),TB-12(0-3),TB-12(3-12),TB-13(0-2),TB-

[3] Spike analyses were conducted on samples: RI-7(0-6) [for batch with 74% recovery of lead and zinc]; TB-12(0-3) [for batch with 57% lead recovery]; MA-3(0-6) [for batch with 67% mercury recovery].

13(2-11),TB-14(0-12)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Mercury:

- Recovery of mercury from the spike sample was **67%** and outside of the 75% - 125% method acceptance range. The following samples were qualified: Turning Basin [none]; S-Bend [MA-10 (0-3),MA-11(0-9),MA-13(0-9)]; MA Federal Channel [MA-1(0-8),MA-2(0-5),MA-3(0-6),MA-3(6-8),MA-4(0-8),MA-5(0-5),MA-6(0-3),MA-8(0-5),MA-20(0-8)]; Rhode Island [RI-8(0-6)].

Zinc:

- Recovery of zinc from the spike sample was **74%** and outside of the 75% - 125% method acceptance range. The following samples were qualified: Turning Basin [TB-8(0-8),TB-8(8-9)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [RI-1(0-6), RI-2(0-4), RI-3(0-5),RI-4(0-5),RI-5(0-5),RI-6(0-6),RI-7(0-6)].

Implications: The spike analyses associated with listed Zinc and Lead samples with 74% recovery do not have significant bias, as the recovery of 74% is insignificantly different than the acceptance range of 75%. The Lead samples associated with a 57% recovery indicate a potential low bias confined to approximately one-third of the samples in the Turning Basin. The Mercury samples in the S-Bend and Federal Channel associated with a 67% recovery indicate a potential low bias. However, the qualified data for Lead and Mercury had concentrations consistent with the unqualified data in the Tier II Evaluation and within the concentration range of the composited sample results of the Tier III Evaluation. It is clear that the Tier II qualified results are consistent with the unqualified data and are therefore representative of the parameter concentration (see the Comparison section below).

¤ - Duplicate outside control limits:

The ¤ qualifier pertains to the duplicate analysis, which measures precision, or repeatability, of laboratory measurements. A sample is homogenized, two aliquots are prepared and analyzed, and the results are compared.[4] The inherent variability of environmental samples can affect these results. The associated QC standard is a relative percent difference (RPD) between the sample and duplicate of 20% or less. The result of a single duplicate analysis is applied to the entire sample batch (approximately 20 samples). Parameters with a RPD greater than 20% are qualified data ("¤").

[4] No spiking is involved in the duplicate analysis procedure, which follows the USACE/EPA Regional Implementation Manual's Quality Assurance guidelines as presented in the RIM Appendix II (Table II-5).

For the Weaver's Cove Tier II Evaluation, three metals had a RPD greater than the 20% QC limit and resulted in a qualification of the entire batch of samples as identified below[5]:

Copper:

- The RPD between replicates was **23%** and higher than the 20% method acceptance limits. Sample result: **7.3 ppm**; duplicate result: **5.8 ppm**. The following samples were qualified: Turning Basin [TB-15(0-3),TB-15(5-11)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

- The RPD between replicates was **25%** and higher than the 20% method acceptance limits. Sample result: **19 ppm**; duplicate result: **15 ppm**. The following samples were qualified: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Lead:

- The RPD between replicates was **21%** and higher than the 20% method acceptance limits. Sample result: **27 ppm**; duplicate result: **22 ppm**. The following samples were qualified: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4)TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

- The RPD between replicates was **24%** and higher than the 20% method acceptance limits. Sample result: **210 ppm**; duplicate result: **170 ppm**. The following samples were qualified: Turning Basin [TB-4(0-6),TB-4(6-10),TB-7(0-10),TB-7(10-14),TB-12(0-3),TB-12(3-12),TB-13(0-2),TB-13(2-11),TB-14(0-12)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

Mercury:

- The RPD between replicates was **31%** and higher than the 20% method acceptance limits. Sample result: **0.19 ppm**; duplicate result: **0.26 ppm**. The following samples were qualified: Turning Basin [TB-2(0-6),TB-3 (0-6),TB-3(6-10),TB-5(0-4),TB-9(0-4),TB-10(0-9),TB-10(9-22)]; S-Bend [none]; MA Federal Channel [none]; Rhode Island [none].

<u>**Implications:**</u> For listed Copper and Lead samples, the RPDs between the sample and duplicate are similar to the QC limits, indicating reasonable duplication and associated

[5] Duplicate analyses were conducted on samples: TB-12(0-3) [for batch with 24% lead RPD]; MACAD-1(0-6) [for batch with 23% copper RPD]; TB-9(0-4) [for batch with 25% copper RPD; 21% lead RPD; 31% mercury RPD].

laboratory precision. Selected Mercury samples in the Turning Basin exhibit somewhat less laboratory precision; however, the mercury analytical results were consistent with unqualified Tier II and Tier III analytical results.

3.0 Comparison between Tier II and Tier III Analytical Results

To further assess the potential for bias to the data, Weaver's Cove compared the Tier II qualified data to the Tier II unqualified data as well as the Tier III unqualified[6] data (Tier III data are provided as Attachment 4). Weaver's Cove chose the three parameters with the "most qualified" results[7] to assess the potential for concentrations to be biased low – Lead, Mercury, and Cadmium.

Attached are three graphs[8] showing the Tier II qualified Lead, Mercury, and Cadmium data plotted and compared to:

1. Non-qualified individual sample values collected during the Tier II evaluation, grouped by geographic area[9]; and

2. Non-qualified composite values collected during the Tier III evaluation in the same geographical area. Lines are used to represent the range of values for Tier III composites in each geographical area.

The graphs clearly demonstrate that:

1. Qualified Lead, Mercury, and Cadmium values are similar to non-qualified Tier II concentrations within the same geographical area and do **not** show a pervasive low bias.

2. Qualified Lead, Mercury, and Cadmium values are generally within the range of values observed in composite samples collected during the Tier III Evaluation and do **not** show a low bias.

---

[6] No Tier III metals data are qualified (other than U – Undetected).

[7] Weaver's Cove selected Lead, Mercury, and Cadmium as the parameters to study in this comparison as these parameters represented both the greatest difference between the quality assurance limit and the analytical testing result as well as the frequency for having multiple qualifiers across the data set.

[8] The graphs depict the following data types: non-qualified data (navy blue), data qualified with an "E" (turquoise), and data qualified with an "N" (yellow). The range of values in the Tier III composites for each dredging element are shown in red.

[9] Rhode Island, Federal Channel, and Turning Basin.

4.0 Conclusions

The QC limit exceedances associated with most of the Tier II qualified data points do not indicate significant bias. To be conservative, the possibility of actual bias was further evaluated by comparing qualified data to non-qualified data from existing datasets. **The results of the QC analysis and comparison with non-qualified data from the Tier II and Tier III evaluations demonstrate that there is no significant low bias to the Tier II data. The Tier II data provide an adequate and representative characterization of the Project sediment.**

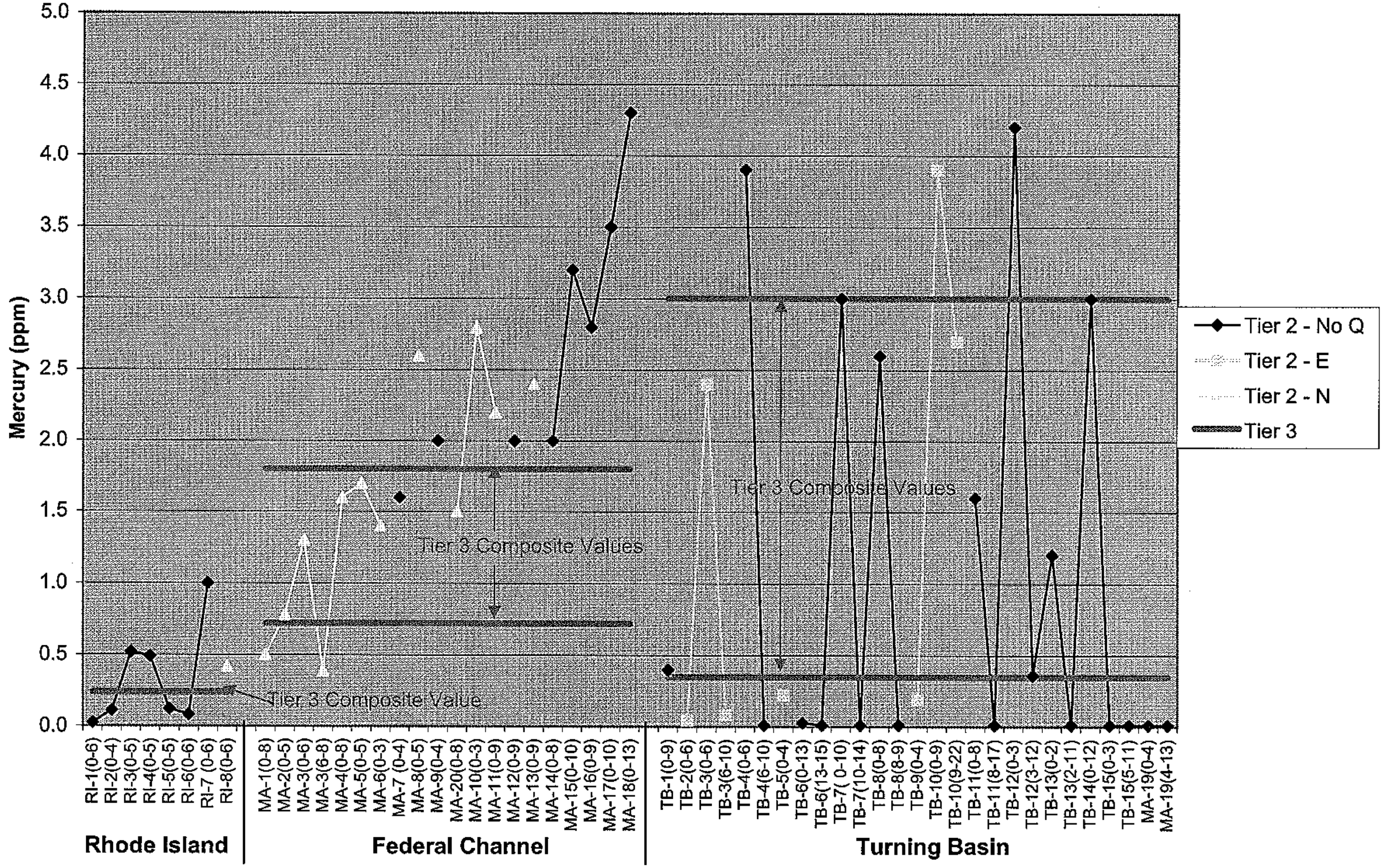
ATTACHMENTS:

1. Graph – Mercury in Tier II and Tier III Sediment Samples
2. Graph – Lead in Tier II and Tier III Sediment Samples
3. Graph – Cadmium in Tier II and Tier III Sediment Samples
4. Table – Tier III Sediment Chemistry Results

Attachment 1

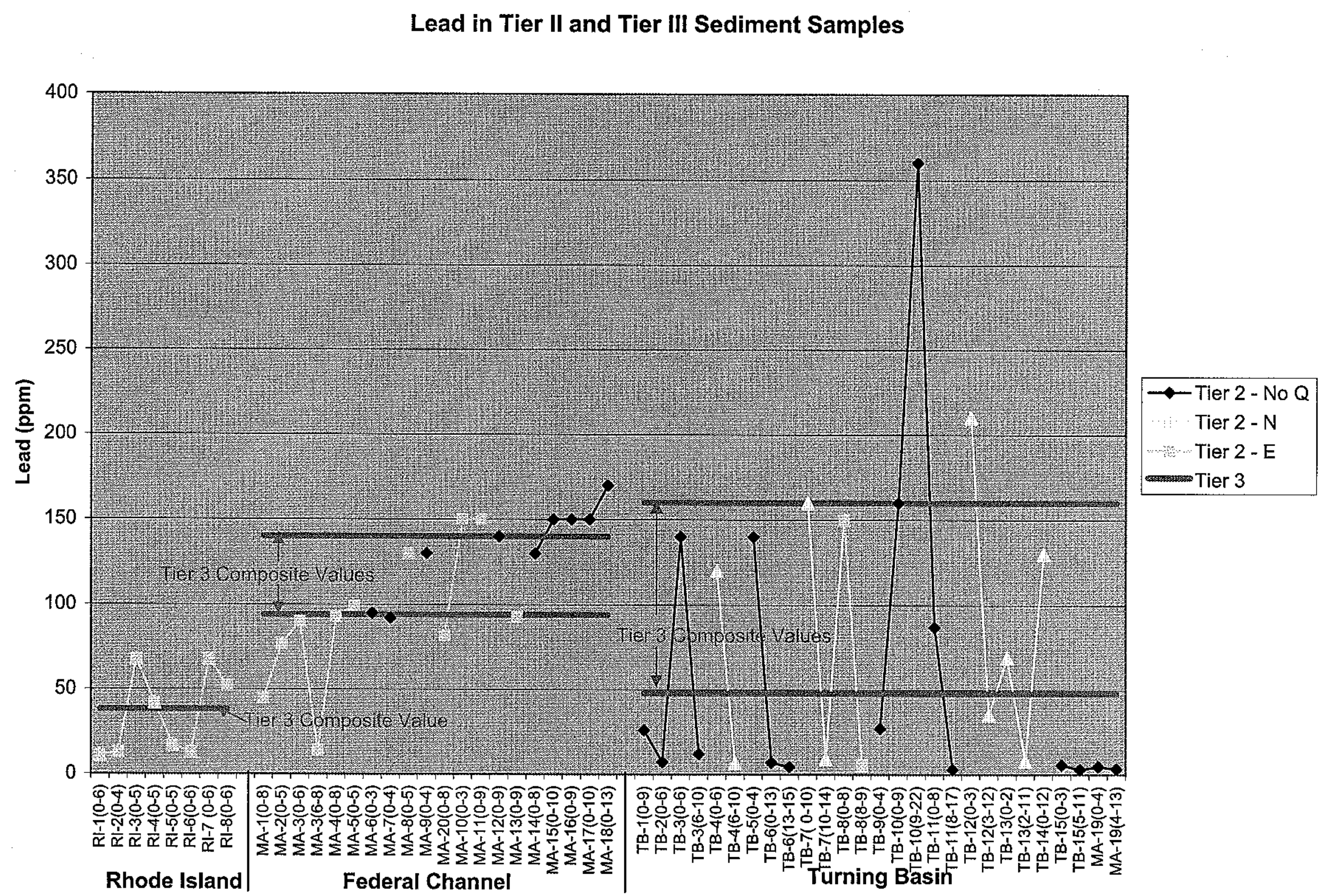
Graph - Mercury in Tier II and Tier III Sediment Samples

Mercury in Tier II and Tier III Sediment Samples



Attachment 2

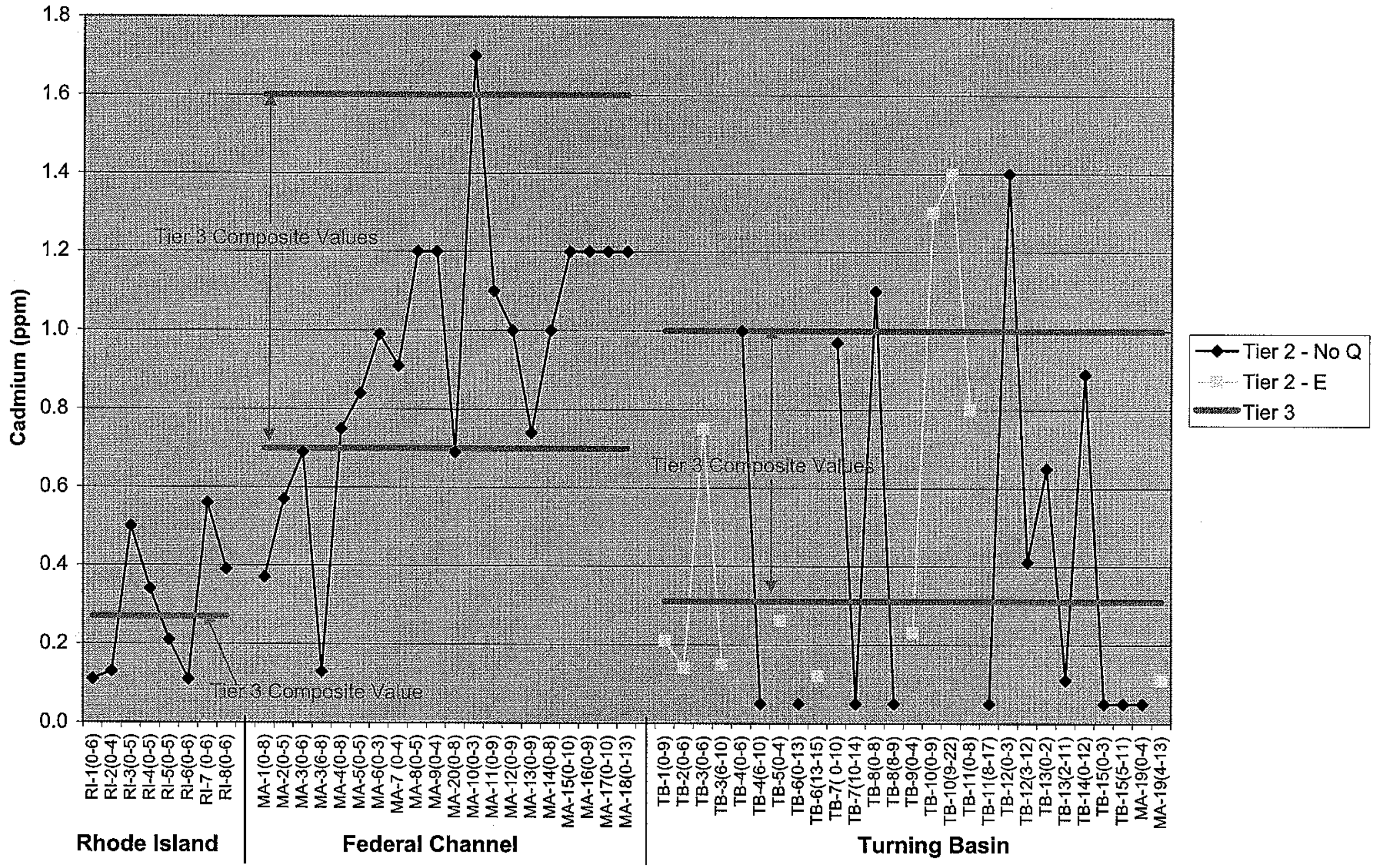
Graph - Lead in Tier II and Tier III Sediment Samples


Lead in Tier II and Tier III Sediment Samples
Lead (ppm)
400
350
300
250
200
150
100
50
0
Tier 2 - No Q
Tier 2 - N
Tier 2 - E
Tier 3
Tier 3 Composite Values
Tier 3 Composite Values
Tier 3 Composite Value
RI-1(0-6)
RI-2(0-4)
RI-3(0-5)
RI-4(0-5)
RI-5(0-5)
RI-6(0-6)
RI-7 (0-6)
RI-8(0-6)
MA-1(0-8)
MA-2(0-5)
MA-3(0-6)
MA-3(6-8)
MA-4(0-8)
MA-5(0-5)
MA-6(0-3)
MA-7(0-4)
MA-8(0-5)
MA-9(0-4)
MA-20(0-8)
MA-10(0-3)
MA-11(0-9)
MA-12(0-9)
MA-13(0-9)
MA-14(0-8)
MA-15(0-10)
MA-16(0-9)
MA-17(0-10)
MA-18(0-13)
TB-1(0-9)
TB-2(0-6)
TB-3(0-6)
TB-3(6-10)
TB-4(0-6)
TB-4(6-10)
TB-5(0-4)
TB-6(0-13)
TB-6(13-15)
TB-7(0-10)
TB-7(10-14)
TB-8(0-8)
TB-8(8-9)
TB-9(0-4)
TB-10(0-9)
TB-10(9-22)
TB-11(0-8)
TB-11(8-17)
TB-12(0-3)
TB-12(3-12)
TB-13(0-2)
TB-13(2-11)
TB-14(0-12)
TB-15(0-3)
TB-15(5-11)
MA-19(0-4)
MA-19(4-13)
Rhode Island
Federal Channel
Turning Basin

Attachment 3

Graph - Cadmium in Tier II and Tier III Sediment Samples

Cadmium in Tier II and Tier III Sediment Samples



Attachment 4

Table – Tier III Sediment Chemistry Results

Tier III Bulk Chemistry Results Summary
Weaver's Cove Energy, LLC

Prepared May 2, 2005

Parameter	Analytical Method	Reporting Limit*	S-Bend Composite		Access Channel Composite		Upper Federal Channel Composite	
PAHs	GC/MS-SIM	ppb	ppb	(Q)	ppb	(Q)	ppb	(Q)
Naphthalene	8270	10	190		52		120	
Acenaphthylene	8270	10	170		34		69	
Acenaphthene	8270	10	66		13	U	26	
Fluorene	8270	10	100		24		42	
Phenanthrene	8270	10	600		120		260	
Anthracene	8270	10	260		61		100	
Fluoranthene	8270	10	1100		180		430	
Pyrene	8270	10	1400		350		640	
Benzo[a]anthracene	8270	10	560		120		250	
Chrysene	8270	10	700		140		300	
Benzo[b]fluoranthene	8270	10	650		120		280	
Benzo[k]fluoranthene	8270	10	520		120		230	
Benzo[a]pyrene	8270	10	710		150		320	
Indeno[1,2,3-cd]pyrene	8270	10	470		91		200	
Dibenz[a,h]anthracene	8270	10	150		30		66	
Benzo[g,h,i]perylene	8270	10	500		100		230	
PCB Congeners	GC/ECD	ppb	ppb	(Q)	ppb	(Q)	ppb	(Q)
BZ 8*	8082	1	3.6		1.3	U	2.5	
BZ 18*	8082	1	1.7	U	1.3	U	1.5	U
BZ 28*	8082	1	4.2		1.3	U	3.3	
BZ 44*	8082	1	2.4		1.3	U	1.5	U
BZ 49	8082	1	3.8		1.3	U	1.9	
BZ 52*	8082	1	5.1		1.3	U	6.9	
BZ 66*	8082	1	4.9		1.3	U	1.5	U
BZ 87	8082	1	2.8		1.3	U	1.7	
BZ 101*	8082	1	11		1.3	U	5.1	
BZ 105*	8082	1	3.5	I	1.3	U	1.9	I
BZ 118*	8082	1	9.2		1.3	U	5	
BZ 128*	8082	1	1.7	U	1.3	U	1.5	U
BZ 138*	8082	1	12	I	1.3	U	6.4	I
BZ 153*	8082	1	6.2		1.3	U	3.8	
BZ 170*	8082	1	4		1.3	U	1.5	U
BZ 180*	8082	1	6.5	I	1.3	U	2.2	I
BZ 183	8082	1	1.7	U	1.3	U	1.5	U
BZ 184	8082	1	1.7	U	1.3	U	4.3	P
BZ 187*	8082	1	1.7	U	1.3	U	2.6	I
BZ 195*	8082	1	1.7	U	1.3	U	1.5	U
BZ 206*	8082	1	4.2		1.3	U	2.2	
BZ 209*	8082	1	3.7		1.3	U	1.8	
Total PCB (Sum of Congeners* x 2)			174.6		46.8		105.4	

Tier III Bulk Chemistry Results Summary
Weaver's Cove Energy, LLC

Parameter	Lower Federal Channel Composite		East Channel Composite		Turning Basin North Composite		Turning Basin South Composite	
PAHs	ppb	(Q)	ppb	(Q)	ppb	(Q)	ppb	(Q)
Naphthalene	39		390		290		240	
Acenaphthylene	21		390		200		180	
Acenaphthene	14	U	130		78		78	
Fluorene	14	U	170		110		82	
Phenanthrene	69		1000		670		510	
Anthracene	29		660		300		360	
Fluoranthene	110		1800		1200		920	
Pyrene	170		2700		1600		1200	
Benzo[a]anthracene	63		1200		650		560	
Chrysene	77		1300		800		740	
Benzo[b]fluoranthene	78		820		690		600	
Benzo[k]fluoranthene	72		880		690		520	
Benzo[a]pyrene	88		1300		830		720	
Indeno[1,2,3-cd]pyrene	64		660		540		410	
Dibenz[a,h]anthracene	21		240		180		130	
Benzo[g,h,i]perylene	70		690		560		490	
PCB Congeners	ppb	(Q)	ppb	(Q)	ppb	(Q)	ppb	(Q)
BZ 8*	1.8		2.6		3.8		3.5	
BZ 18*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 28*	1.8		4.3		5.1		13	
BZ 44*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 49	1.4	U	1.6		2.8		2.8	
BZ 52*	2.2		6.2		9.2		6.2	
BZ 66*	1.4	U	1.6	U	5.9		1.5	U
BZ 87	1.4	U	3.5		3.2		2.5	
BZ 101*	3.3		8.1		9.7		9.2	
BZ 105*	1.4	U	3.7		1.6	U	1.8	I
BZ 118*	1.9		5.5		9.3		6.8	
BZ 128*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 138*	1.7	I	9.1	I	12	I	7.1	I
BZ 153*	1.5		3.3		6.5		5	
BZ 170*	1.4	U	4.4		4.6		5.6	
BZ 180*	1.4	U	1.6	U	3.2	I	4.7	I
BZ 183	1.4	U	1.6	U	1.6	U	1.5	U
BZ 184	1.4	U	4.8		1.6	U	1.5	U
BZ 187*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 195*	1.4	U	1.6	U	1.6	U	1.5	U
BZ 206*	1.4	U	8.3		6.1		2.7	
BZ 209*	1.4	U	9.6		10		2.4	
Total PCB (Sum of Congeners* x 2)	59.2		152.6		190		154	

Tier III Bulk Chemistry Results Summary
Weaver's Cove Energy, LLC

Parameter	Analytical Method	Reporting Limit*	S-Bend Composite		Access Channel Composite		Upper Federal Channel Composite	
Pesticides	GC/ECD	ppb	ppb	(Q)	ppb	(Q)	ppb	(Q)
4,4'-DDD	8081A	1			1.3	U		
4,4'-DDE	8081A	1	5.8		1.3	U	2.8	
4,4'-DDT	8081A	1			1.3	U		
Aldrin	8081A	1			1.3	U		
alpha-Chlordane	8081A	1			1.3	U		
cis-Nonachlor	8081A	1			1.3	U		
Dieldrin	8081A	1			1.3	U		
Endosulfan I	8081A	1			1.3	U		
Endosulfan II	8081A	1			1.3	U		
Endrin	8081A	1			1.3	U		
gamma-BHC	8081A	1			1.3	U		
gamma-Chlordane	8081A	1			1.3	U		
Heptachlor	8081A	1			1.3	U		
Heptachlor epoxide (B)	8081A	1			1.3	U		
Hexachlorobenzene	8081A	1			1.3	U		
Methoxychlor	8081A	1			1.3	U		
Oxychlordane	8081A	1			1.3	U		
trans-Nonachlor	8081A	1			1.3	U		
Toxaphene	8081A	25			32	U		
Metals		ppm	ppm	(Q)	ppm	(Q)	ppm	(Q)
Arsenic	6020A	0.4	15		9.7		11	
Cadmium	6020A	0.07	0.96		0.31		0.7	
Chromium	6020A	0.5	260		54		130	
Copper	6020A	0.5	120		26		82	
Lead	6020A	0.5	140		48		94	
Mercury	7471A	0.02	1.4		0.35		0.72	
Nickel	6020A	0.5	31		15		26	
Zinc	6020A	1	260		91		200	
Physical								
Total Organic Carbon (Run 1) (%)	9060		4.2		1.9		3.5	
Total Organic Carbon (Run 2) (%)	9060		4.1		2		3.2	
Percent Moisture	2540G		60		46		56	

Tier III Bulk Chemistry Results Summary
Weaver's Cove Energy, LLC

Parameter	Lower Federal Channel Composite		East Channel Composite		Turning Basin North Composite		Turning Basin South Composite	
Pesticides	ppb	(Q)	ppb	(Q)	ppb	(Q)	ppb	(Q)
4,4'-DDD			6.5					
4,4'-DDE			4.5					
4,4'-DDT			2.9					
Aldrin			1.6	U				
alpha-Chlordane			1.6	U				
cis-Nonachlor			2.1					
Dieldrin			1.6	I				
Endosulfan I			1.6	U				
Endosulfan II			1.6	U				
Endrin			1.6	U				
gamma-BHC			1.6	U				
gamma-Chlordane			1.6	U				
Heptachlor			1.6	U				
Heptachlor epoxide (B)			1.6	U				
Hexachlorobenzene			1.6	U				
Methoxychlor			1.6	U				
Oxychlordane			1.6	U				
trans-Nonachlor			1.6	U				
Toxaphene			39	U				
Metals	ppm	(Q)	ppm	(Q)	ppm	(Q)	ppm	(Q)
Arsenic	9.7		15		18		14	
Cadmium	0.27		1.6		1		0.79	
Chromium	62		140		280		270	
Copper	36		94		120		110	
Lead	38		140		160		110	
Mercury	0.24		1.8		2.2		3	
Nickel	23		24		29		23	
Zinc	110		310		260		210	
Physical								
Total Organic Carbon (Run 1) (%)	2.2		4.1		4.6		4.6	
Total Organic Carbon (Run 2) (%)	2.5		4		5		4.7	
Percent Moisture	52		56		58		54	

*Reporting Limits taken from USEPA/USACE Final Regional Implementation Manual, Tables 2-3, April 2004.

NOTE: RIM Table 3 does not list RLs for pesticides alpha-Chlordane, gamma-BHC, and gamma-chlordane, so an RL of 1ppb was chosen based on other chemically similar pesticides.

P - Greater than 40% RPD between the two columns; the higher value is reported according to the method.

I - Due to interference, the lower value is reported.

U - The analyte was analyzed for but not detected at the Reporting Limit; therefore, the sample is conservatively reported at the Reporting Limit.

Parameters not analyzed (as specified in the US Army Corp's Sampling Plan).

Weaver's Cove Energy - Summary of Reference Documents and Technical Reports Related to Navigation

Source Document	Cite
c. 91 Waterways Permit Application for Dredging	§ 2.3.4.1 (Att. A – Project Narrative).
FERC Final Environmental Impact Statement	See p.476 (pipeline construction on navigation – bottom of page); §4.8.6.2 (pp.4-168 through 4-172); see pp.4-187 through 4-189, and pp.4-308 through 4-310 (ship traffic); see p.4-254 (LNG Vessel Transit in Narragansett Bay); § 4.12.5.1 (pp.4-259 through 4-266); § 4.12.5.2 (pp. 4-269 through 4-274); see p.5-12 (summary comments on recreational impacts); see Appendix K: Comments Received on DEIS (SOI-22 (p.K-59), WAT-5 (p.K-75), WAT-9 (p.K-76), LAN-6 (p.K-89), LAN-7 (p.K-90), LAN-9 (p.K-90), LAN-10 (p.K-90), LAN-14 (p. K-91), LAN-15 (p. K-91), LAN-16 (p.K-91), SAF-69 (p.K-120), SAF-70 (p. K-120), SAF-109 (p. K-127), SAF-110 (p. K-127), SAF-119 (p.K-127), SAF-149 (p. K-135), SAF-151 (p. K-136), SAF-152 (p. K-136), SAF-216 (p. K-147), SAF-225 (p. K-149), SAF-278 (p. K-158), SAF-315 (p. K-166), SAF-325 (p. K-168).
FERC Draft Environmental Impact Statement	§ 4.12.5.1 (pp. 4-205 through 4-209); § 4.12.5.2 (p. 4-212).
Final Environmental Impact Report	§1.2.3.9 (pp.1-16 through 1-18); §7.1 (pp. 7-1 through 7-12); § 9.0 (see Exhibit 9-1); Appendix 7-1 (Draft Navigation Work Plan).
Second Supplemental Draft Environmental Impact Report	§ 9.2 (pp. 9-2 and 9-3 (including reference to correspondence with DEP on 1-27-05)); § 11.0 (pp. 11-1 through 11-15); Appendix 11-1 entitled "FEIS Excerpts Describing Ship Traffice in Narragansett Bay and Ports of Fall River and Somerset".
Supplemental Draft Environmental Impact Report	Appendix A (pp. 160-163 and pp. 208 & 209)
U.S. Army Corps of Engineers Responses to Comment Letters, Review of Public Interests Factors, & Compliance with Section 404(b)(1) Guidelines (May 17, 2006)	Attachment A, § 5.1.4 (pp. 36 through 38); Attachment B, Table 1-2 – Navigation (pp. 31 through 34) & Recreation (pp. 34 & 35); Attachment E, USCG NVIC 5-05 "Guidance on Assessing the Suitability of a Waterway for LNG Marine Traffic"
Response to Public Comments on the Water Quality Certification Application for Dredging	See TRSC.09
Response to Public Comments on the c. 91 Waterways License and Permit Applications	See FR06.11, WAS.19, TRWA.06, TRSC.09, AUCLAIR.01.

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June 6, 2007

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Captain Roy A. Nash
Captain of the Port
Southeastern New England
United States Coast Guard
1 Little Harbor Road
Woods Hole, MA 02543

RE: U.S. Coast Guard Letter of Recommendation

Dear Captain Nash:

Weaver's Cove Energy, LLC ("Weaver's Cove") received the attached letter dated June 4, 2007 from the Massachusetts Department of Environmental Protection ("MassDEP"). In this letter, MassDEP asserts that it was advised by the U.S. Coast Guard that a Letter of Recommendation ("LOR") for the Weaver's Cove Project will be issued sometime this summer. Specifically, the MassDEP letter states: "An additional, critical consideration is that the Coast Guard has informed MassDEP that it expects to make a final assessment of whether the waterway is suitable for the Weaver's Cove smaller ship proposal this summer." If this time frame is accurate, Weaver's Cove is encouraged, as it has not previously been provided with a decision timeline for the issuance of an LOR by the U.S. Coast Guard.

Based on this information reportedly received by MassDEP from the U.S. Coast Guard, MassDEP states: "For the above reasons, it is reasonable and appropriate for MassDEP to await the U. S. Coast Guard final assessment before resuming its technical reviews of the pending permit applications …."

Weaver's Cove would like to receive written confirmation that the final assessment, the LOR issued by the U.S. Coast Guard, will be available to all parties this summer. Your letter of May 9, 2007 to Weaver's Cove identified three issues that must be addressed before an LOR can be issued: (1) navigational issues associated with small ships, (2) security issues associated with small ship transits, and (3) environmental issues associated with small ship transits, with a particular focus on the Taunton River segment of the waterway.

As Weaver's Cove indicated earlier, we will be providing USCG Sector Southeastern New England later this month with additional information regarding navigational issues identified in the May 9 letter, in addition to the Feasibility Study from the Northeast Marine Pilots which was sent to your office last month, and which your May 9 letter identified as a key piece of missing data. We expect to provide you with a similar confirmation from Marine Safety International on the navigational suitability. We would appreciate your confirmation as to whether you now have sufficient information to complete the navigation safety component of the LOR process or if you need Weaver's Cove to provide supplementary information or data. It would be helpful if you could provide us with an indication of what steps the U.S. Coast Guard contemplates would be involved in completing the navigational safety review.

Your May 9 letter indicated that additional security reviews would be required, to supplement the extensive security workshops held in 2004 and 2005 regarding the Weaver's Cove project. Again, to assist our planning, we would appreciate a projection of the scope of these workshops and the schedule as to when and how many of these workshop sessions will be held. It appears from the May 9 letter that the primary focus of these workshops and assessments will be the Taunton River segment of the transit, and Weaver's Cove views these workshops as an opportunity to meet its obligations for an ongoing update of security planning as identified in the conditions to our FERC authorization. In this respect, we will shortly be submitting additional security related information under SSI protection which will provide helpful in refining the earlier security plans for the LNG tankers (Weaver's Cove's as well as KeySpan's).

Finally, Weaver's Cove provided MSO Providence with a comprehensive small ships environmental update in November of 2006. Weaver's Cove did not receive any comments, questions or requests for further information from the U.S. Coast Guard on that update. Your May 9 letter indicated that additional review of this supplemental information under the National Environmental Policy Act ("NEPA") will be required. However, the May 9 letter did not indicate what information, in addition to the November environmental information Weaver's Cove already submitted, will be required for this NEPA review, the scope of this review, when it will take place, and under what jurisdictional forum it is being undertaken.

For planning purposes and to assure that Weaver's Cove provides the U.S. Coast Guard all necessary information, please advise:

(1) whether the nature of environmental review stated in the May 9 letter will be in the form of an Environmental Assessment or an Environmental Impact Statement;

(2) when public notice of the scope of the environmental review will be issued;

(3) when public notice of opportunity to comment or to participate in public scoping meetings will be issued;

(4) is the U.S. Coast Guard anticipating hiring a third party contractor to assist in the preparation of any supplemental documents prepared under NEPA?

(5) for the environmental review process under NEPA contemplated by the May 9 letter, the expected schedule for the completion of that process.

If, contrary to what was stated in the June 4 letter from MassDEP, the above steps cannot be completed and an LOR issued this summer, Weaver's Cove would appreciate the U.S. Coast Guard's best estimate of a schedule showing when the work can be completed and an LOR issued. We appreciate any efforts you can make to clearly communicate the nature and timing of the U.S. Coast Guard review process to all interested parties, so that accurate and informed decision making can be applied to the permit reviews being undertaken by the other federal and state permitting agencies reviewing the Weaver's Cove Project.

As you will see from the attached news report, other parties seem to have additional specific information on the U.S. Coast Guard's pending decision and are making absolute statements that you have already pre-determined the outcome of this process. Since neither the communications the U.S. Coast Guard may have had with the Mayor of Fall River, nor with the Acting Commissioner of MassDEP are in the public domain, we believe it is important for you to clarify for Weaver's Cove when and how the U.S. Coast Guard intends to proceed.

Very truly yours,

BFK /lg

Bruce F. Kiely
Attorney for
Weaver's Cove Energy, LLC

Enclosures

cc: Ed LeBlanc
Gordon Shearer
Blair MacIntyre
Ted Gehrig
Leon Bowdoin

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
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Lieutenant Governor

IAN A. BOWLES
Secretary

ARLEEN O'DONNELL
Commissioner

June 4, 2007

Ted Gehrig
President and Chief Operating Officer
Weaver's Cove Energy, LLC
One New Street
Fall River, MA 02720

Dear Mr. Gehrig:

The Department of Environmental Protection ("MassDEP") has reviewed the May 9, 2007 letter and related Executive Summary from the United States Coast Guard to Weaver's Cove Energy, LLC ("Weaver's Cove") in which the Coast Guard preliminarily determined that the waterway may not be suitable for the type and frequency of LNG marine traffic contained in the Weaver's Cove smaller tanker proposal. The Coast Guard's determination was based on a review that included the original Letter of Intent ("LOI") filed by Weaver's Cove on May 12, 2004; the FERC Order dated July 15, 2005; the Weaver's Cove amended LOI describing its smaller ships proposal dated February 2, 2006; the Weaver's Cove Environmental Assessment of the Use of Smaller Ships dated November, 2006; the Weaver's Cove Waterway Suitability Assessment dated November 22, 2006, and the Weaver's Cove Additional Smaller LNG Ship Design, Navigational and Operational Data report dated February 21, 2007.

The Coast Guard's May 9, 2007 assessment identified multiple navigation safety, security and environmental problems associated with the Weaver's Cove proposal. More specifically, the Coast Guard found that "the doubling of tanker transits and the slower movement of tankers through the waterway segment between Borden Flats and the proposed Weaver's Cove facility presents navigation safety and security challenges and environmental impacts beyond those addressed in the original LOI" and that "the aggregate of navigation safety factors...are not measurably improved in submissions since the Weaver's Cove [amended LOI] submittal of February 2, 2006." See page 1 of the Coast Guard letter and page 2 of the Executive Summary. The Coast Guard's findings also encompass areas that are directly relevant to MassDEP's permitting of the project such as the Coast Guard's conclusion that "the safety and security zone encompassing the tanker would effectively stop recreational traffic in the Taunton River for its transit through the old and new Brightman Street bridges." See page 14 of the Executive Summary.

While preliminary in nature, the substance and outcome of the Coast Guard's May 9, 2007 determination represents a significant change in the overall status of the Weaver's Cove project and casts serious doubt as to the feasibility of the project. Moreover, the Coast Guard's assessment of the navigational, security, and environmental impacts associated with the Weaver's Cove proposal also has a bearing on MassDEP's own review of the key pending permit applications. An additional, critical consideration is that the Coast Guard has informed MassDEP that it expects to make a final assessment of whether the waterway is suitable for the Weaver's Cove smaller ship proposal this summer. If the Coast Guard reaffirms its May 9, 2007 preliminary assessment, Weaver's Cove will not be allowed to transport LNG by ship as proposed.

In any event, the Coast Guard's final assessment will include a definitive evaluation of navigational issues such as the dimensions of the smaller ships and the impact of the doubling of the transits on other water dependent users. For example, the Coast Guard disagreed with Weaver's Cove suggestion that changes in the vessel drafts used for the purposes of modeling (a 34' design draft and a 36' scantling draft) do not significantly affect modeling outcomes. Instead, the Coast Guard stated that it "fully expects that the depth of water under the keel of a ship in a dredged channel, particularly in a relatively narrow river, will in fact make a difference." See page 11 of the Executive Summary. The Coast Guard's final assessment of the draft of the small ships in determining feasibility from a navigation safety standpoint is relevant to MassDEP's independent determination of the scope of dredging to be allowed under Chapter 91. See, 310 CMR 9.40(3)(a) ("The extent of dredging shall not exceed that reasonably necessary to accommodate the navigational requirements of the project.")

The Coast Guard also highlighted its concern about Weaver's Cove need to employ what the Coast Guard described as a "locking through" procedure for small ships proceeding at bare steerageway between the old and new Brightman Street bridges for up to 260 times per year. See page 11 of the Executive Summary. The Coast Guard's final assessment will inform MassDEP's own evaluation of the resulting impacts to other water dependent users and the public's right to navigation for the purpose of determining Weaver's Cove compliance with the Chapter 91 performance standards.

In short, the Coast Guard expects to make its final assessment of the Weaver's Cove small ships proposal in the near future - this summer - and the outcome of that critical decision will likely affect both the feasibility of the project and the substance of MassDEP's permit reviews. This situation warrants MassDEP's reassessment of its expenditure of limited permitting resources on the pending permit applications.

For the above reasons, it is reasonable and appropriate for MassDEP to await the Coast Guard's final assessment before resuming its technical reviews of the pending permit applications and Requests for Superseding Orders of Conditions for the dredging activity and for the LNG terminal (the latter includes an assessment of the Chapter 91 impacts of the ship traffic resulting from the operation of the terminal). Accordingly, MassDEP is staying its technical reviews of the above permits until the Coast Guard has made its final Letter of Recommendation determination. If the Coast Guard determines that the waterway is suitable for the Weaver's

Cove smaller ships proposal, MassDEP will resume its technical review of these pending permit applications.

Sincerely,

Arleen O'Donnell
Acting Commissioner

cc: Barry Fogel, Esquire
Captain Roy A. Nash, United States Coast Guard
Edward G. LeBlanc, United States Coast Guard
Richard Lehan, MassDEP
Phillip Weinberg, MassDEP
Lealdon Langley, MassDEP

Hess LNG urged to withdraw Fall River proposal

By Joao Ferreira

Standard-Times staff writer

June 05, 2007 6:00 AM

Hess LNG should withdraw its proposal for a liquefied natural gas terminal in Fall River now that the state Department of Environmental Protection has decided it will stop its review of the project's permit applications, opponents said Monday.

"They should now announce that this project is dead," said Fall River Mayor Edward M. Lambert Jr.

The state agency cited concerns about the project raised by the Coast Guard as the reason for stopping the review.

"This situation warrants MassDEP's reassessment of its expenditure of limited permitting resources on the pending permit applications," Arleen O'Donnell, acting commissioner, wrote Monday in a letter to Weaver's Cove Energy.

"The DEP is right — it makes no sense to spend limited taxpayer resources reviewing this project," said U.S. Rep. James McGovern, D-Mass.

Jim Grasso, a spokesman for Weaver's Cove Energy, expressed confidence the state's decision won't stop them.

"This is not an unusual action for an agency to take for a project like this," he said. "We intend to get approval from the Coast Guard. The project is moving forward."

Mayor Lambert sees it otherwise.

"It's very clear from the conversation I had with the Coast Guard that they have no intent of permitting this project," he said. "I think the company is running out of rope."

The proposal for a terminal on the banks of the Taunton River in Fall River has won approval from the Federal Energy Regulatory Commission. But the Coast Guard cited navigational safety, security and environmental concerns in a May 9 "preliminary assessment."

Mr. O'Donnell said if the Coast Guard eventually determines that the waterway is suitable, the state would resume its review. A final report from the Coast Guard is expected later this summer.

"While preliminary in nature, the substance and outcome of the Coast Guard's May 9, 2007, determination represents a significant change in the overall status of the Weaver's Cove project and casts serious doubt as to the feasibility of the project," Mr. O'Donnell said.

"I think it's very significant for a state agency to tell an applicant that they're not going to consider a permit any further," Mayor Lambert said before a press conference on the issue. "I think it's a serious blow to the project."

Capt. Roy A. Nash, commander of the Coast Guard's southeastern New England sector, wrote last month that the developers have yet to show that LNG tankers "can be safely navigated through this waterway on a consistent, repeatable basis."

Reiterating a concern he raised in March 2006, Nash said 750-foot tankers would need to perform an "extraordinary navigational maneuver" to pass through the old and new Brightman Street bridges, which are about 1,100 feet apart and off-set. The older, smaller bridge has an 98-foot navigational opening. The tankers are 85 feet wide.

"The Coast Guard has made it very clear that as long as both the old and new bridges exist, there are significant safety problems with the Fall River LNG proposal," Rep. McGovern said. "As we have said over and over again, it makes no sense to put an LNG facility in the middle of Fall River."

Critics fear the LNG terminal could endanger residents in the densely populated area. They say almost 64,000 people live along the tanker route. A terrorist strike or accident could be devastating, they warn.

Weaver's Cove Energy, however, argues the Northeast needs the facility to meet growing energy demands. Some energy analysts have predicted that by 2010 there won't be enough natural gas supply to keep up with the region's energy needs.

Mayor Lambert has fought the proposal vigorously for years and once promised to kill it with "a thousand paper cuts."

Monday he said that objective is closer.

"It is something I'm convinced will never happen here," he said. "It's long past time for the company to back out of this project and choose to somewhere else."

— Material for this report was provided by The Associated Press.

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